A CHILTON PUBLICATION

The Iron Age

E NATIONAL METALWORKING WEEKLY

April 19, 1951

ENTS PAGE 2

Farval helps sheet leveler show $2500 monthly saving

WITH this machine, a kitchen range manufacturer saves nearly $2,500 a month. It is a McKay Leveler, through which steel sheets are passed to correct irregular grain structure—a cause of breakage in deep drawing operations.

Steady, economical operation of the leveler is insured by a Farval Centralized Lubrication System. Forty-two bearings are served by a manual pumping unit.

With Farval on the job, it isn't necessary to stop the machine for periodic oiling, because a few quick strokes of the pump lever once or twice each work shift lubricate every bearing—adequately and without waste. Nor is it ever necessary to shut down the leveler for repair or replacement of bearings damaged or worn out by faulty lubrication.

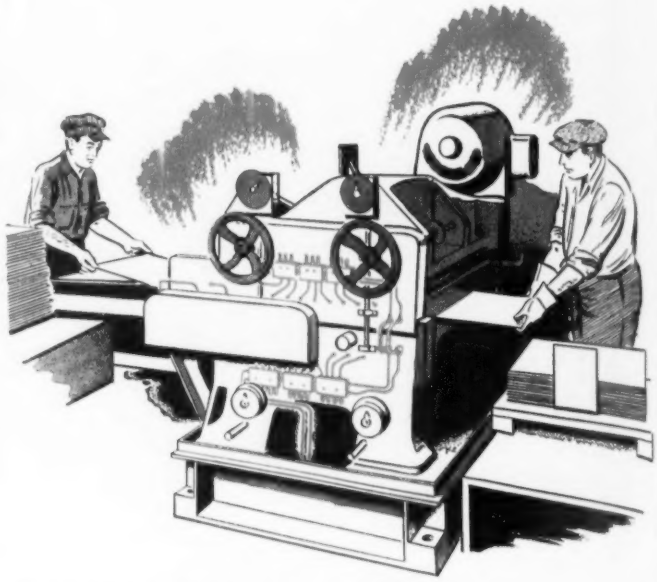
Just as the McKay Leveler soon pays for itself in savings, so also a Farval system on any machine soon pays for itself—by the savings it brings in bearing expense and lubricant cost, not to mention oiling labor and production time saved.

Farval is the original Dualine system of centralized lubrication, proved practical in 20 years of service. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned.

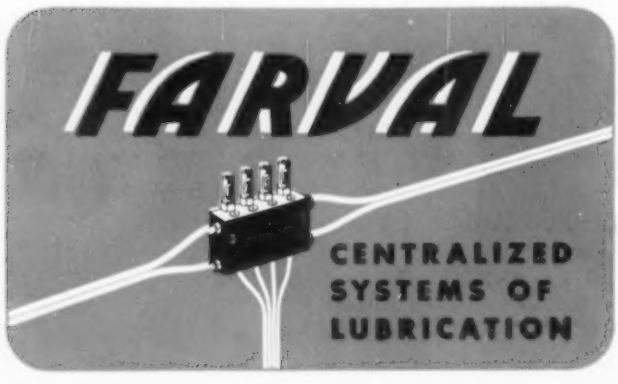
Write for Bulletin 25 for full details. The Farval Corporation, 3252 East 80th Street, Cleveland 4, O.

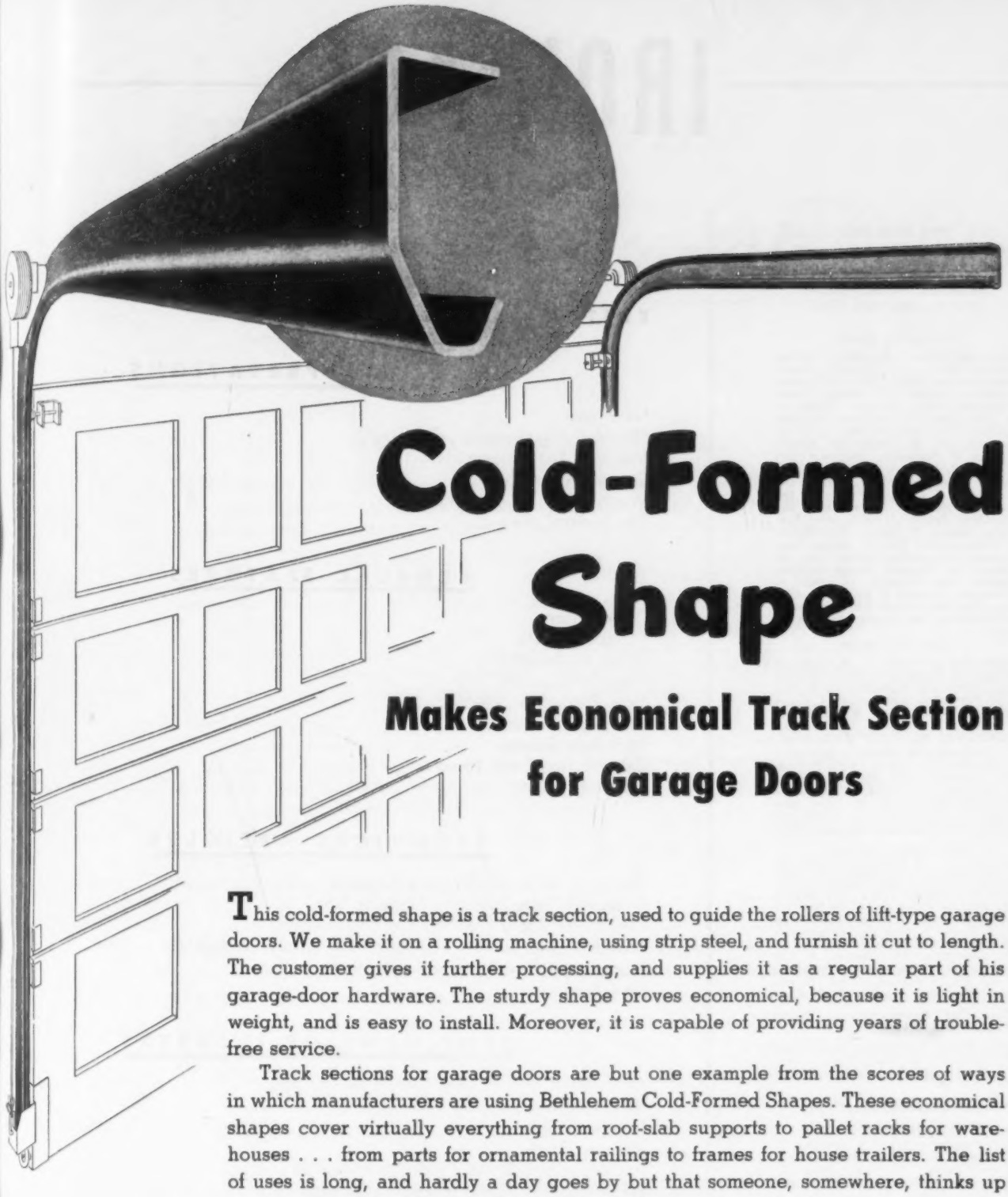
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

FARVAL—*Studies in Centralized Lubrication*
No. 118



McKay Sheet Leveler on which all bearings are Farval lubricated. Farval Centralized Lubrication Systems, manually operated and automatic, lubricate over a million bearings in the iron and steel and metal working industries alone.





Cold-Formed Shape

Makes Economical Track Section for Garage Doors

This cold-formed shape is a track section, used to guide the rollers of lift-type garage doors. We make it on a rolling machine, using strip steel, and furnish it cut to length. The customer gives it further processing, and supplies it as a regular part of his garage-door hardware. The sturdy shape proves economical, because it is light in weight, and is easy to install. Moreover, it is capable of providing years of trouble-free service.

Track sections for garage doors are but one example from the scores of ways in which manufacturers are using Bethlehem Cold-Formed Shapes. These economical shapes cover virtually everything from roof-slab supports to pallet racks for warehouses . . . from parts for ornamental railings to frames for house trailers. The list of uses is long, and hardly a day goes by but that someone, somewhere, thinks up a new, practical application for these versatile shapes.

Bethlehem Cold-Formed Shapes are made from strip, sheet or plate steel, in all gages from 7 to 20, inclusive. They are uniform in thickness, and their surface is relatively free from scale. They have an ideal strength-to-weight ratio.

There's a good chance that somewhere in your shop a Bethlehem Cold-Formed Shape could do the job better, and perhaps more economically, than the material you are now using. We'll be glad to look into it with you. Give us a call at any time —either at the nearest Bethlehem sales office, or at Bethlehem, Pa.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

IRON AGE

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IRON AGE

editorial

Rough Going Ahead!

THE MacArthur incident has overshadowed the quick approach of a temporary but drastic impact on our economy. This is coming because large defense contracts are beginning to jell. The metalworking field is the target.

People have been warned that this industrial typhoon was coming. Those who took time to read Charles Wilson's report to the President on the defense program could see what was in store for business and industry.

Those who saw what was coming told their friends months ago that the impact would be far greater than anticipated. Recently there have been a flurry of reports that steel would be easier; that there would be a slight recession in buying; and that civilian demands would be hit far less than had been expected.

Most of that talk was, and is, wishful thinking. By the time the National Production Authority gets back the new Controlled Materials Plan forms from various military and other claimant agencies telling what their demands are, there is going to be plenty of confusion—and surprises.

It will take a Herculean effort by NPA and its people to process this CMP which they hope to have working by July. It will take much longer than that before it will be working with precision—if it ever does.

It will take all the help and cooperation possible from business and industry to keep inflation out of steel and other metal demands. It will take months for NPA to wring the water out of the overall demands from various claimant agencies. But it must be done—and it must be done before our general economy is wrecked.

Every ton of steel which defense and defense-supporting people ask for that they really don't need will be a blow to the regular economy which must support the gigantic defense program.

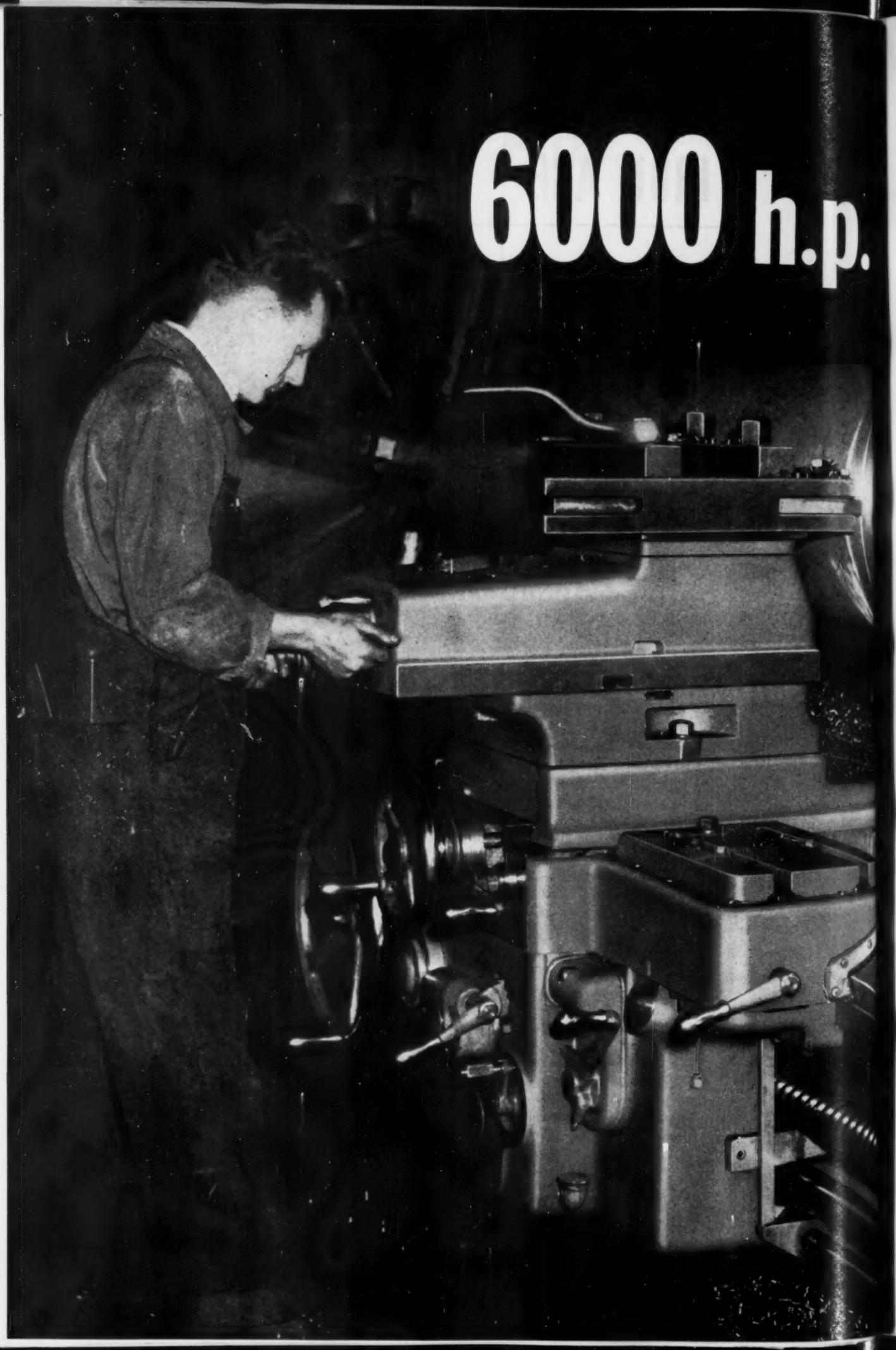
Every time a special group tries to get more than it needs, tries to get it too far ahead, or tries to get a classification to which it is not entitled, that will mean a dent in our economy.

There is serious reason for these warnings. It now looks as if defense and "special" programs plus essential civilian needs will take close to 75 pct of total steel output by the third quarter. After that those needs may take even more steel. That leaves only 25 pct for a host of things called nonessential items such as washing machines, cars, radios and refrigerators.

That is a far different picture than some have painted. It will be painful to many who would not believe how much the defense program would strain our economy. Only by patience, by restraint and by cooperation can we get the defense program on its way without upsetting our applecart.

Tom Campbell

Editor


6000 h.p.

IRON AGE *newsfront*

news methods and product forecast

► The Ordnance Corps has earmarked $5½ million for research and development on titanium. This sum includes a 62½-net ton blanket order to three producers from whom Ordnance will eventually order shipment as the material is needed to build prototypes.

► One reason potential subcontracting shops are not going after defense business is that they prefer to continue their regular peacetime products as long as materials for civilian production are available. This is just another practical example of why a dual economy won't work like the planners think.

► Some of the recently developed phosphors may bring important changes in home and industrial lighting. Thin coatings of phosphor and aluminum (or some other metal) are put on a piece of glass; when current is applied the whole glass glows brightly enough to be practical for illuminating use.

Used on wall switch plates, clock faces, etc., they operate for a few cents a year. Larger ceiling and wall panels are coming.

► A line of small bolts, nuts and rivets is now being made of titanium. So far orthopedic uses are the only active application but big quantities may be used in aircraft.

► This may be a limited emergency in Washington but for the machine tool industry it's an all-out effort. The industry's present backlog is just about three times higher than it ever was during World War II--and that backlog is still rising. Though facilities are not quite as big, today's 22-month backlog contrasts with a maximum of 7 months during the last war.

► The current shortage of bar steel--both carbon and alloy--is not finding a ready solution through conversion. Facilities are almost impossible to find. Another factor: Quality cannot be compromised as was possible with sheet steel that could be readily changed from one stamping to another.

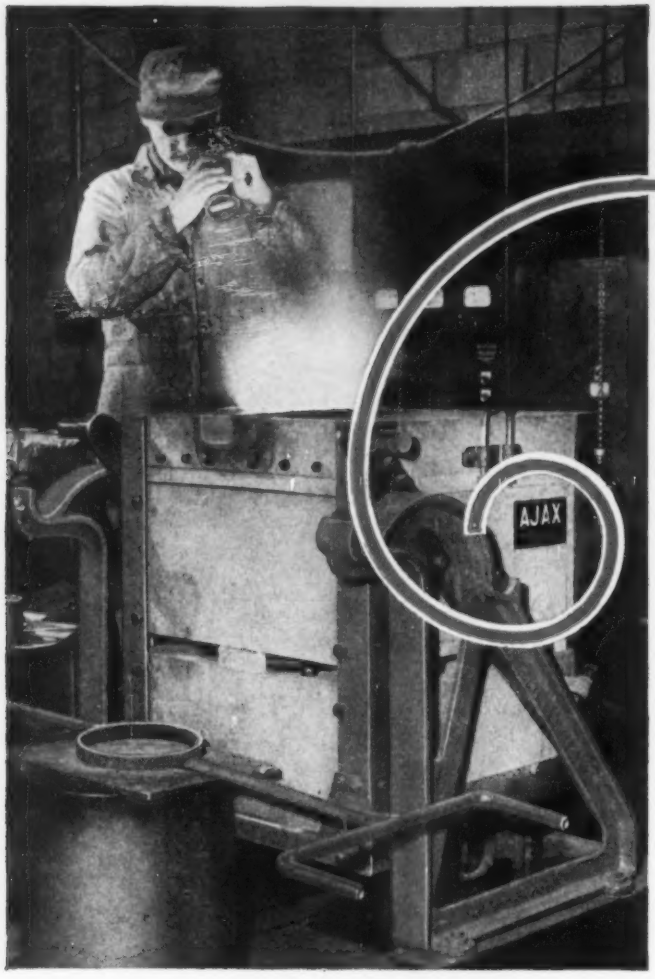
► The auto industry appears to be continuing its policy of building all the cars possible as fast as possible. Most passenger car schedules are holding at existing high levels and in many cases truck schedules have been increased.

► Weird government rulings on prices have so botched up the machine tool industry that quoting a firm price is practically impossible. Some machine tool makers can't quote on machines badly needed to get the defense program rolling because they know they will lose money on the contracts.

► A recently developed computing machine mechanism which can replace hole plates on a dividing head or circular table divides a circle into equal parts for every number from 2 to 1100 and all even numbers to 2198. It eliminates the labor bottleneck in indexing work and is applicable to all worm and wheel ratios except 5:1.

► The 10,000-freight car a month goal is still a long way off. Unbalanced inventories in carbuilding shops and suppliers' plants are holding output down.

► Lack of a national wage board is hurting small business--causing some smaller companies to lose help to larger firms that are allowed to pay higher wages and offer more fringe benefits.



Casting Precision

STARTS IN THE MELT with

AJAX-NORTHRUP INDUCTION FURNACES

The precision that distinguishes fine castings must *start* in the melt . . . in precise control of composition, in accurate pouring temperature. The kind of control that only one furnace can provide . . . the Ajax-Northrup high frequency furnace. Take a look at the facts:

Speed: Speed is a function of power. Furnaces may be overpowered for extremely fast melting . . . normally or underpowered where slower melting schedules are permissible.

Analysis Control: In melting high alloy steels, alloying elements often can be kept within 0.25% of desired composition, carbon within 0.01 or 0.02%. Excellent, too, for "fussy" non-ferrous alloys. Because it stirs as it melts, you get uniform results heat after heat.

Economy: Fast melting minimizes oxidation, prevents loss of valuable alloy constituents, prolongs refractory life. It's the most economical way to melt metals high in chromium, nickel, tungsten, etc.

Flexibility: Makes no difference what metals you melt or what quantities . . . Ajax-Northrup's precision, speed, easy control, and flexibility in linings permit you to cover emergencies, meet almost any production schedule. Just name your alloys and quantities, and we'll send you the proper technical bulletins.

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HEATING & MELTING

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IRON AGE *summary*

iron and steel industry trends

CMP does not mean easier steel . . . Inflated material requests expected . . . Wringing out water hard . . . "Free" steel disappearing.

Easier Steel?—Those who expect the new CMP to bring about an improvement in steel supply are doomed to disappointment. CMP will mean more steel only to those who get their tonnage requests approved by proving themselves essential to reviewing officials. The impact on nonessential parts of the economy will be terrific.

Manufacturers of consumer durables, especially autos and appliances, will be hard hit. Depending on the speed with which CMP forms are processed, nonessential users face production limitations.

Through the Wringer—The speed and impact of CMP depends on two things: (1) The amount of "water" officials are able to wring out of material requests and (2) the speed with which forms are processed.

Total requests for steel will be far greater than available production. The job of evaluating and deflating them will prove painstaking and burdensome. Worst of all, officials responsible for this job will have to resist great pressure from many sources.

The Hard Facts—Consumers' CMP forms will not all be processed at once. Military and supporting requests will be processed first, then special programs, and others in the order of their importance. Some consumers who fill out forms may not receive CMP steel for many months; others may never receive tonnage under the program.

Depending on NPA's administrative speed, and economic necessity, about 75 pct of total finished steel output will be going to military and "essential civilian" users when the program hits its stride during the fourth quarter of this year. It may be even more unless NPA is successful in wringing water from the avalanche of demands.

Vanishing Supply—The strain on the economy will be such that there are bound to be some cracks. Economic unbalance, labor crises, and casualties among the small plants which have not gotten defense orders will have to be worked out. Meanwhile, there will be a steadily vanishing supply of free market steel.

This week the larger steel firms find their order-deck already stacked to the tune of 50 pct for defense and essential programs. Some middle-sized firms show bookings about 40 pct for these programs. Even smaller mills, which had not expected to get hit so hard and fast, find steel bookings to these users as high as 35 pct. These figures are only good for this week. They will become steadily higher, as more consumers are included under CMP.

Order From Confusion—Compared with the headaches of processing consumers' CMP forms, the transition will be smooth for producers. CMP will restore order to mill scheduling which has been kept in a state of confusion because of constant changes in DO set asides, special NPA directives, and new government programs. Sometimes government directives have required mills to ship tonnages in advance of normal production cycles. These confusing irritations would disappear under CMP.

Good Motive, Bad Result—The open-end feature of the new program is an effort to keep controls at a minimum. It is questionable that this half-slave, half-free market can survive. For one thing, controls breed controls. Also, competition among consumers for the 25 pct or less of "free" steel will be indescribably intense. It also looks like good bait for a future Washington investigation on "steel distribution during the emergency."

Steel production this week is scheduled at 103 pct of rated capacity, up half a point from the previous week.

See "Can You Make It?"—new Iron Age subcontracting service on p. 107

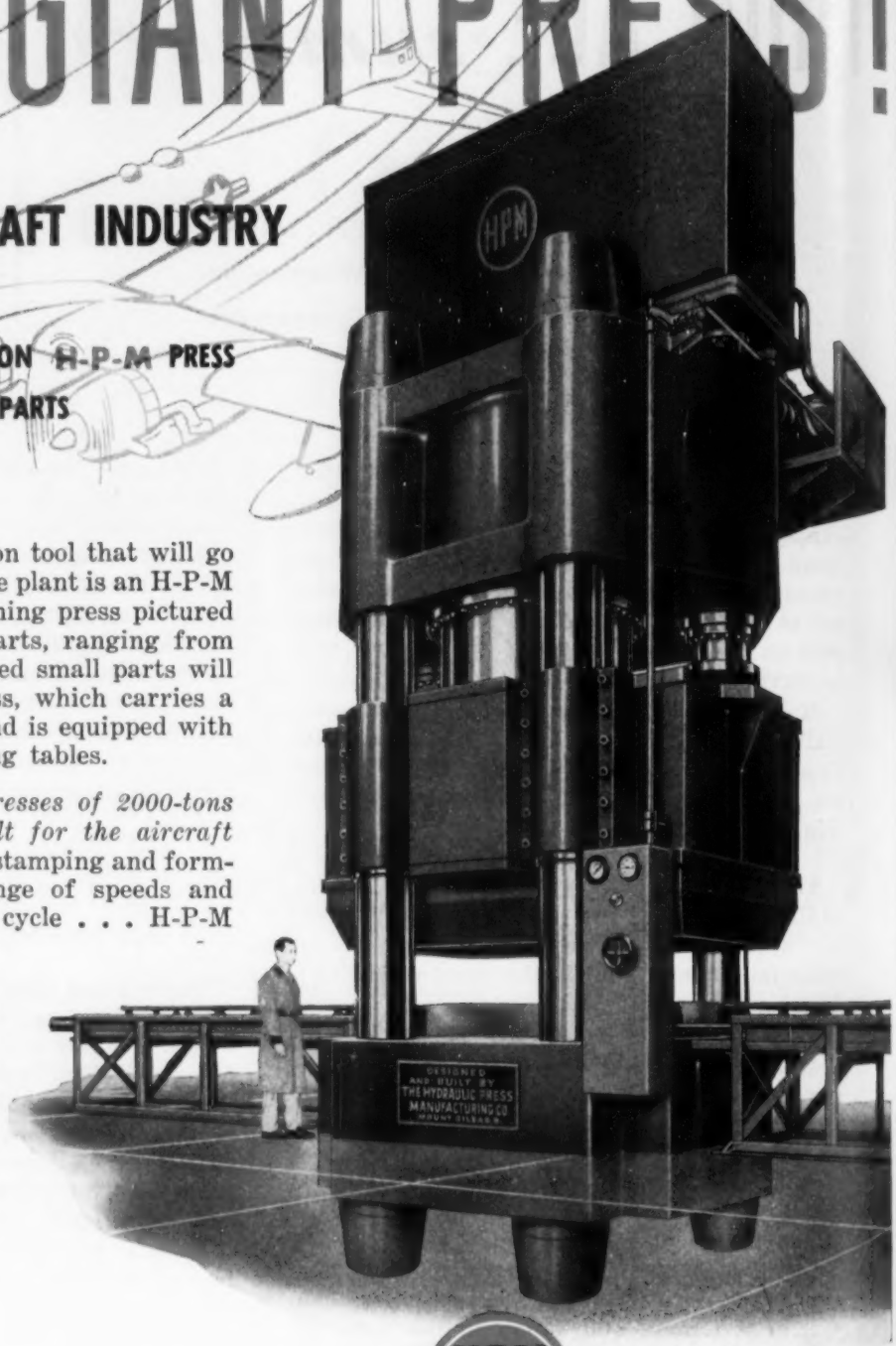
NEW GIANT PRESS!

...FOR THE AIRCRAFT INDUSTRY

BOEING TO PUT 7000-TON H-P-M PRESS TO WORK ON BOMBER PARTS

● The newest production tool that will go to work in Boeing's Seattle plant is an H-P-M 7000-ton rubber pad forming press pictured at the right. Bomber parts, ranging from large bulkheads to assorted small parts will be produced on this press, which carries a rubber pad 48" x 120" and is equipped with hydraulic actuated loading tables.

Thirty-six H-P-M presses of 2000-tons or larger have been built for the aircraft industry for such special stamping and forming jobs. The wide range of speeds and controls . . . automatic cycle . . . H-P-M FASTRAVERSE "closed circuit" hydraulic power system and top operating economies have made H-P-M presses the choice of the entire metal working industry. Find out what H-P-Ms can do for your production problems by calling in an H-P-M engineer today.



Write for a free copy of Bulletin 5005 which describes in full H-P-M FASTRAVERSE press operations and features.

HPM

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Makers of Presses for the Metal Working and Processing Industries - Plastic Molding Presses - Die Casting Machines - Hydraulic Pumps, Valves and Power Units

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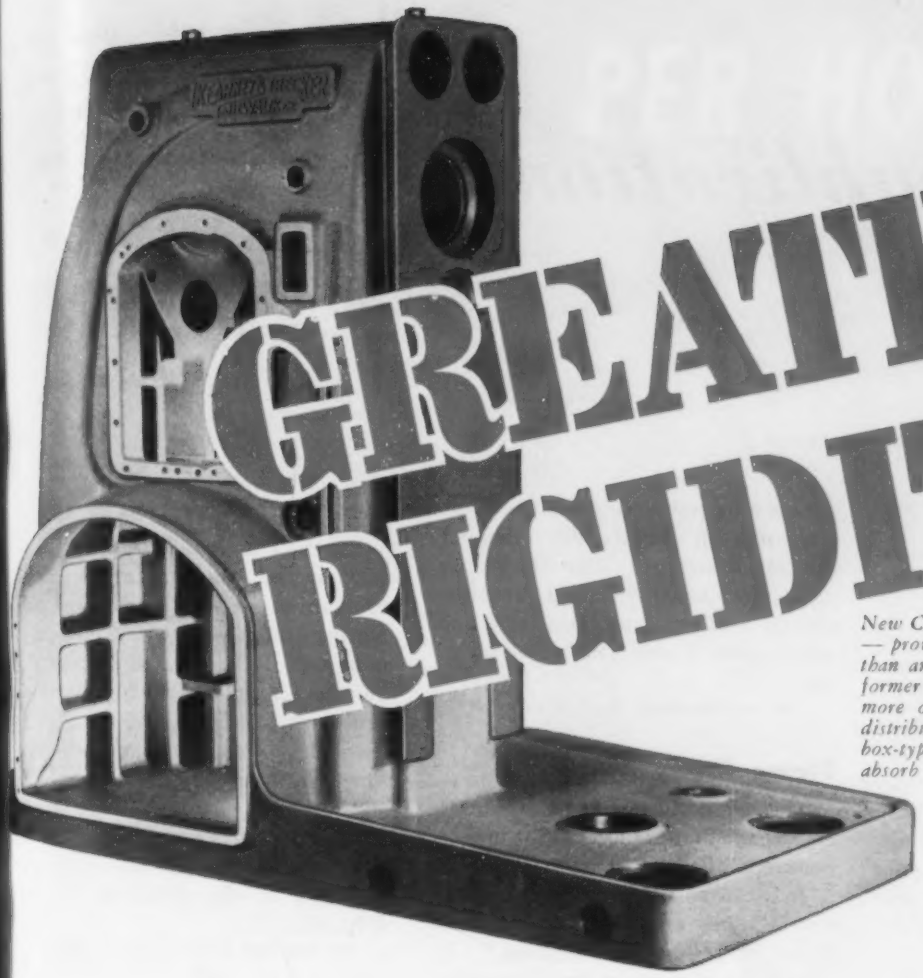
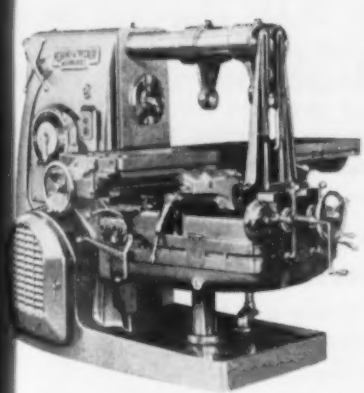


GREATER RIGIDITY

New CK columns give you extreme Rigidity — provide a backbone structure far stronger than any you've ever known. Compared to former columns, they give you 1000 pounds more of dense, high-test iron scientifically distributed in close heavy section ribbing, in box-type sponson construction — built to absorb the heaviest cutting loads.

A new line of knee-type milling machines KEARNEY & TRECKER MILWAUKEE CK's



New Model CK
25 hp No. 5 Plain Style
Milling Machine

YES. Kearney & Trecker's new CK milling machines are packed with design and operating features that make them *more productive, more profitable for you.*

Spindle-mounted flywheel, broad feed and speed ranges and greater horsepower with separate motor drives for spindle, and feed and rapid traverse, mean you get fullest possible benefit from modern cutting tools.

New design 2" diam. table feed screw affords greater bearing contact between screw and nut and is equipped with positive-acting backlash eliminator. These features guarantee smoother feed for conventional and climb milling, give you longer screw life and greater accuracy.

For greater production, these machines are equipped with Kearney & Trecker's famous Mono-Lever Control that shortens floor-to-floor time, and materially reduces operator fatigue. New, non-glare micrometer dials help avoid costly errors in reading . . . give you a positive lock at every setting.

Automatic flood lubrication in column and knee and positive metered lubrication to table and saddle, plus generously proportioned gears and shafts assure you greater machine life.

Find out for yourself about Kearney & Trecker's new CK line of knee type milling machines . . . how they meet every demand of modern milling practice . . . how they can give you greater production at greater profit.

Sizes are No. 2, 3, 4, 5, and 3 . . . Plain and Universal styles. For complete details, contact your nearest representative or write direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

REPLACEMENT OF OBSOLETE MACHINE TOOLS
AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE

KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS

FREE *publications*

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just fill in and mail the postcard on the opposite page.

Perforated Metal

A number of the countless uses for perforated metal are shown in a 128-p. catalog listing hundreds of sizes and shapes of perforations that are available in nearly every material which can be obtained in the form of coils, sheets and plates. The thumb-indexed booklet illustrates both functional and ornamental perforations, grilles and louvres, belt guards and many other items. Complete specifications and other engineering data are included. *Harrington & King Perforating Co.*

For free copy insert No. 1 on postcard.

Handbook on Springs

To conserve the time of busy design engineers and others interested in springs, Accurate's 40-p. "Handbook of Technical Data on Springs" was made as compact as possible; it includes only data and information that are most generally useable, and should be helpful to both experienced engineers and those who are newly assuming the responsibilities of spring design and purchase. A section of this handy reference and guide deals with how to specify various spring types. *Accurate Spring Mfg. Co.*

For free copy insert No. 2 on postcard.

Welding Equipment

Eisler resistance type welders are described in a new 32-p. catalog showing some of the varied uses for this equipment, the production facilities and departments where the welders are manufactured, and a large number of units ranging from ½ to 300 kva. Welders in foot- hand- air- and motor-operated types that incorporate automatic sequence time controls and can produce 300 welds per min are described. Also shown are units for soldering and brazing, special welding arms, jigs, tips and accessories. *Eisler Engineering Co., Inc.*

For free copy insert No. 3 on postcard.

Flame Story

The contribution that the oxy-acetylene flame has made to the progress of industry is outlined in a new 16-p. booklet, "Oxy-Acetylene Flames and Metalworking—A Story of Industrial Progress." It traces the history of the oxy-acetylene flame and explains how industry is using it today in cutting, welding, and heating operations. Many specialized jobs of the flame, such as hard-facing, flame-softening, flame-hardening, power-cutting, and steel-conditioning, are briefly described. *Linde Air Products Co.*

For free copy insert No. 4 on postcard.

Tubing Steels Bulletin

Condensed technical information for engineers on the design, fabrication and use of tubing for elevated temperature and high pressure applications is contained in a new 6-p. bulletin. It contains such information as analyses, physical and mechanical properties, creep strength, short time elevated temperature tensile strength, and oxidation resistance of 14 of the more popular tubing steels. Included are data on carbon, intermediate chrome molybdenum and stainless steels used in high temperature, high pressure service. *Babcock & Wilcox Tube Co.*

For free copy insert No. 5 on postcard

Plating Contractor

Pyrene's unusual metal finishing service for manufacturers, parts companies, repair companies and plating jobbers is described in a new 4-p. folder summarizing numerous special metal finishing processes and telling how this problem-licking combination of men, processes and equipment can put an end to any ordinary or special finishing difficulties. The strict laboratory control practiced by this company is also detailed. *Pyrene Mfg. Co.*

For free copy insert No. 6 on postcard

Tool Specialties

The story of Vlier products and their success is told in a new 8-p. bulletin describing such tool specialties as spring plungers, torque thumb screws, fixture keys and spring stops. Typical applications are shown, along with detailed specifications and a summary of advantages offered by these cost-cutting products for simplifying operation. Fixture keys of both the reamed-hole and milled-slot types are described. *Vlier Mfg. Co.*

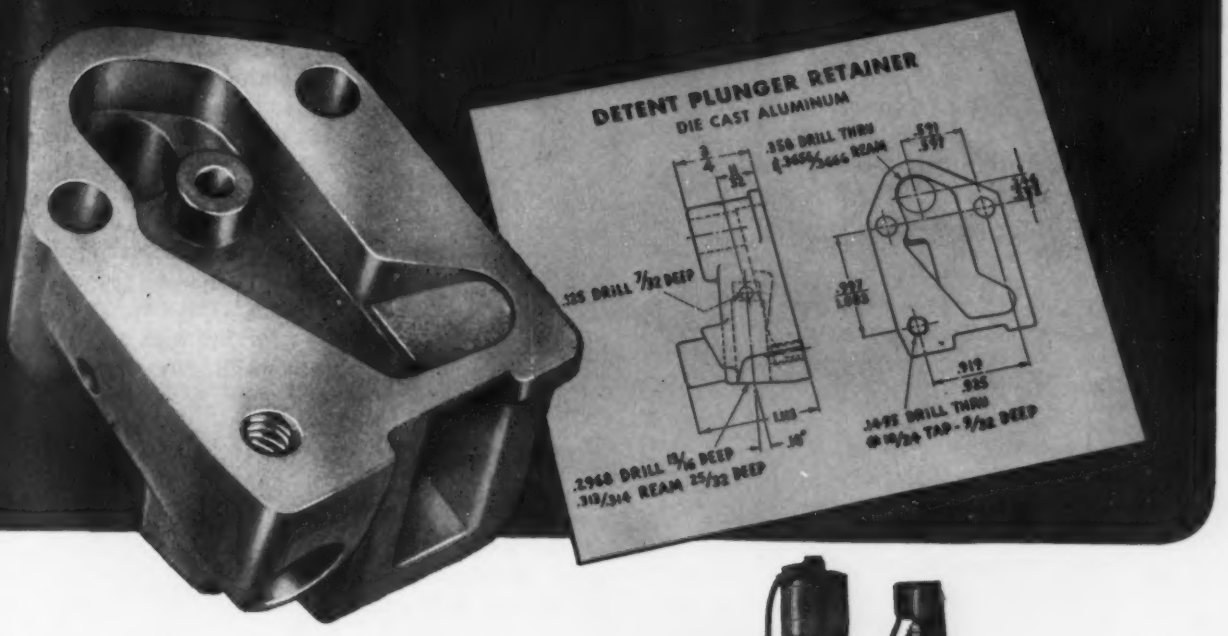
For free copy insert No. 7 on postcard

Uses for Cast Monel

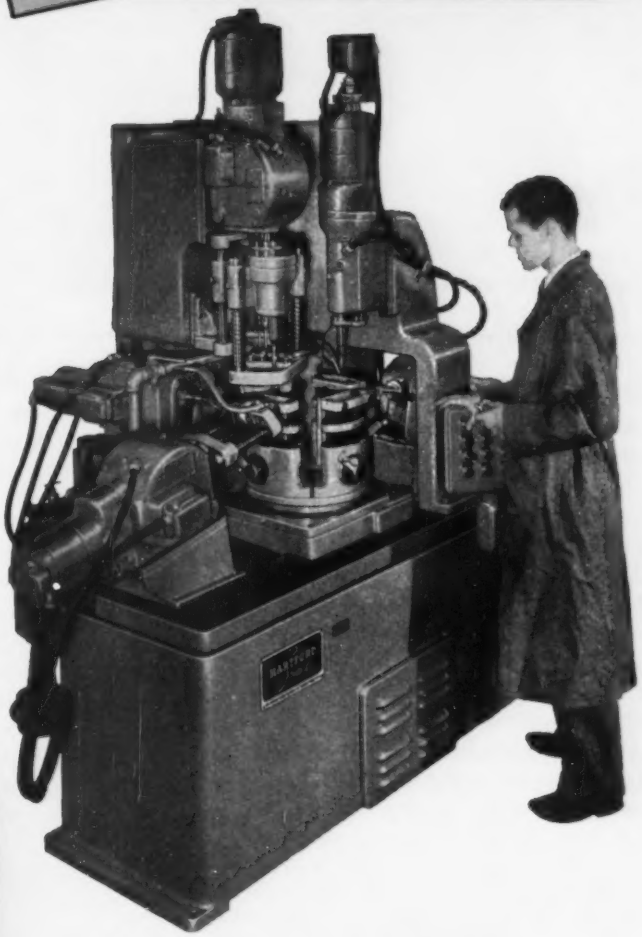
A new 8-p. booklet contains valuable information on the production of cast Monel and the wide range of desirable physical and mechanical properties obtainable. The use of Monel in the handling of acids and alkalies as well as its machinability and weldability characteristics are discussed. Detailed charts showing the corrosion resistance of cast Monel to various materials; its mechanical and physical properties and

Turn to Page 118

360 PCS. PER HOUR...



drilled, reamed & tapped on this ➡ Hartford Special Automatic Drilling & Tapping Machine



HARTFORD *Special*

Write for New Bulletin

THE HARTFORD SPECIAL MACHINERY CO.

HARTFORD 12, CONNECTICUT

production ideas

Continued

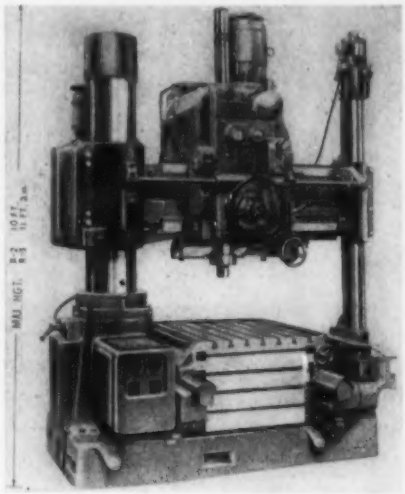
closer with switch, controls spindle drive and brake. Newly designed collets have double bearing spacing for greater precision and increased gripping power. Draw-in collet capacity is 1⅛ in., stationary collet, ⅞ in. Automatic indexing turret revolves on ball thrust bearing with constant preload opposed by taper roller bearing preventing vertical error; the locating and locking index pin engages jig-ground holes on index plate, preventing lateral error. *Rivett Lathe & Grinder, Inc.*

For more data insert No. 25 on postcard, p. 35.

Production Jig Borers

Large capacity machines have 18 spindle speeds and 12 feeds.

Oerlikon production jig borers for precision and production boring, drilling, reaming, tapping, screw cutting, facing and outside turning without jigs are double column machines so designed that the boring head, cross rail and smaller column can be locked rigidly in any position. This rigid frame makes it possible to locate holes, by the coordinate method, using gage blocks or pins, to a tolerance of 0.0004 to 0.0008 in. between centers and to drill holes as small as 0.040 in. diam. The R-2 model machine has speeds from 38 to 1900 rpm and feeds from 0.0012 to 0.031 ipr; the R-3 has speeds from 30 to 1500 rpm and feeds from 0.0012 to 0.0472 ipr. Additional design features include:



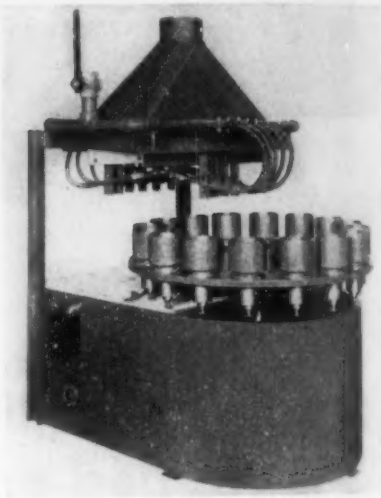
a fast mechanical return of spindle, in addition to hand operation; an automatic feed for setting depth of holes up to 14½ in.; a tool-ejector bar inside the boring spindle; graduated precision scales with vernier readings to 0.0008 in. on ways of boring slide and work table. All operating controls are located on the boring head. *Cosa Corp.*

For more data insert No. 26 on postcard, p. 35.

High Speed Heating Unit

For brazing or annealing shells; 600 per hr in 60-in. diam unit.

A new, gas-fired production heating machine is suited for two types of operations: brazing plugs or adapters into ends of shell type units; and annealing mouths of shell cartridges. The heating zone consists of two rows of high speed zig-zag burners with high rate of heat output that bring the sections to be brazed or annealed to the proper temperature in a minimum of time. Heat is confined to the work area, eliminating the usual excessive heating of surrounding portions. Cups holding the pieces are provided with spindles that rotate while passing through the



heating zone. Various types and sizes of turntables or conveyer units are available. Gas-air mixture is supplied by a Furkert gas-air mixer. *Gas Appliance Service, Inc.*

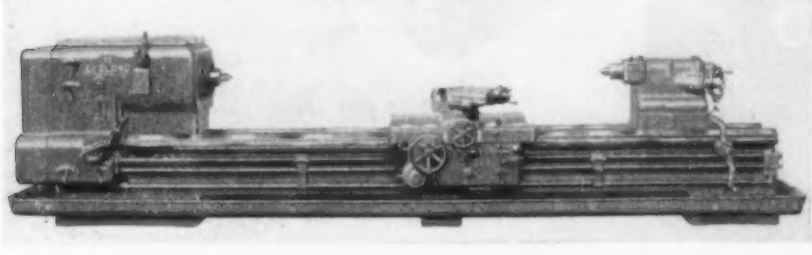
For more data insert No. 28 on postcard, p. 35.

Heavy Duty Engine Lathe

Four-directional power rapid traverse is standard equipment.

Fast and convenient traversing of carriage and cross-slide, each in two directions, is possible on a new 32-in. heavy duty engine lathe. The machine is equipped for hydraulic or mechanical profiling. Other features include 34½ in. swing, 32 spindle speeds from 4 to 500 rpm, totally-enclosed quick-change box, hardened and ground replaceable steel bed ways and automatic lubrication through headstock, quick-change box and apron. The headstock incorporates the free-running principle with hardened and ground steel gears; only the gears acutally needed are in mesh at a given speed, the remainder running free. No-load friction horsepower is thus minimized, leaving maximum power available for removing metal. The machine is arranged for 25, 30 or 40 hp motor, 1200 rpm. Forty-eight feeds and threads may be selected; feeds from 0.004 to 0.250 in.; threads from ¾ to 46. *R. K. LeBlond Machine Tool Co.*

For more data insert No. 27 on postcard, p. 35.



Oil Cooler

Produces desired machine tool temperatures through refrigeration.

Dissipating heat generated by machine tools and producing desired temperatures through refrigeration are possible with the new Will-Cool oil cooler. The product is furnished to cool and control cutting oil to a predetermined temperature the year round and can be supplied to control also lubricating oil or hydraulic oil temperatures at the same time. The lubricating and hydraulic oils are not exposed to

Turn to Page 122

IRON AGE *introduces*

J. M. Kaplan and **M. D. Safanie**, appointed directors of SHARON STEEL CORP., Sharon, Pa. **John P. Kelsey** joined the staff of the treasurer's office.

Harvey E. Witwer, promoted to the position of general factory superintendent of GEUDER, PAESCHKE & FREY CO., Milwaukee.

Robert D. Lawson, named manager, machine division of the NORTON CO., Worcester, Mass. Mr. Lawson replaces **C. Denson Day**, who has resigned.

Charles K. Munn, elected treasurer; **John B. Stiles**, assistant treasurer, and **Keith R. Rodney** elected assistant secretary of the EDGECOMBE STEEL CORP., Hillside, N. J.

Birger Engstrom, elected president of McDOWELL MFG. CO., Pittsburgh, succeeding **W. R. Schuchman**, who becomes chairman of the board.

John T. Lancaster, joined CONNER TOOL & CUTTER CO., Detroit, as works manager.

Martin Kelly, elected a vice-president of CONTINENTAL MOTORS CORP., Muskegon, Mich.

T. J. Ewbank, appointed division sales manager of the newly created Dallas lighting sales division of SYLVANIA ELECTRIC PRODUCTS, INC.

Lester M. Sears, elevated to chairman of the board of directors of TOWMOTOR CORP., Cleveland. Mr. Sears was founder and president of the corporation since its establishment.

Kenneth A. Tamms, joined the staff of RAYBESTOS - MANHATTAN, INC., Passaic, N. J., as sales engineer for Wisconsin of the abrasive and diamond wheel department of the Manhattan Rubber Division.

William Paul Neal, appointed manager of the enlarged steel department of KAUNITZ & O'BRIEN, INC., New York.

Charles W. Devan, assumed the duties of credit manager for the Whiting, Detroit and St. Louis offices of Federated Metals Div., AMERICAN SMELTING & REFINING CO.

John Kuneau, advanced to vice-president - executive staff, of the PHILCO CORP., Philadelphia.

Dale W. Delaney, named Pacific coast manager for C. TENNANT & CO. Mr. Delaney's office is located in San Francisco.

Gaetan M. Zucco, appointed contracting manager, fabricated steel construction division of BETHLEHEM PACIFIC COAST STEEL CORP., Los Angeles.

John G. Patten, appointed assistant general traffic manager for KAISER ALUMINUM & CHEMICAL CORP., with headquarters in Oakland, Calif.

Max R. Dodson, promoted as assistant comptroller of LONE STAR STEEL CO., Dallas. **Carl H. Kreutziger** has joined the company as project manager of the new steel mill expansion program.

Robert F. Jones, named purchasing agent, plant equipment, LOCKHEED AIRCRAFT CORP., Burbank, Calif.

Turn to Page 70

V. H. PETERSON, elected vice president in charge of railroad sales, Fairbanks, Morse & Co., Chicago.

CURTIS FRANKLIN, elected chairman of the board of directors, Automatic Steel Products, Inc., Canton, Ohio.

THOMAS C. BEATTIE, appointed general superintendent, Fairless Works of National Tube Co., Morrisville, Pa.

IRON AGE *salutes*

Ernest T. Weir

VISION and independence are the priceless and untaxable ingredients in the success story of Ernest T. Weir, chairman of National Steel Corp.

Leader, critic and defender of the steel industry, he speaks his mind on many subjects—like it or lump it. Industry, from worker to management, has learned to respect his opinions.

Always a pioneer, Ernie was one of the first to recognize the market potentials of tinplate, sheet and strip. Developments at Weirton Steel, and later National Steel, aimed at this market.

In 1905 Ernie Weir and J. R. Phillips, two young men with a lot of steel industry savvy, saw their golden opportunity. They bought the idle plant of the bankrupt Jackson Sheet & Tin Plate Co. at Clarksburg, Va.

By 1915 Ernie had made the shoestring operation one of the largest independent producers of tinplate in the country. That position has been maintained ever since. Under his powerful forward drive, Phillips was piloted from a small, heavily mortgaged plant to the successful, integrated operation which today includes Weirton Steel, M. A. Hanna Co., and Great Lakes Steel Corp.

Ernie pioneered in application of the continuous rolling process to light, flat-rolled stock, and in development of the electrolytic tinplate process. National was also one of the first to use oxygen in openhearths.

Through his career, Ernie Weir has stressed the positive in business—higher wages, better quality, more modern plants, lower costs to the consumer, plant safety, better community relations. These have made National Steel successful.

GORDON MURPHY, appointed vice-president in charge of manufacturing, Precision Gear Div., Foote Bros. Gear & Machine Corp., Chicago.

ALAN G. BINNIE, appointed vice-president of Kollsman Instrument Corp., Elmhurst, N. Y.

SEWARD T. SLAVAGE, named advertising manager of the Timken Roller Bearing Co., Canton, Ohio.

L. F. DESMOND, appointed director of advertising and merchandising, Dodge Div., Chrysler Corp., Detroit.

IRON AGE *introduces*

Continued

Ralph N. Hillner, named Central district sales manager of the H. M. HARPER CO. Mr. Hillner will supervise 9 regional offices, with headquarters in Morton Grove, Ill.

Albert S. Puelicher, appointed a director to fill the unexpired term of John H. Daum, who has resigned from the board of directors of the GIDDINGS & LEWIS MACHINE TOOL CO., Fond du Lac, Wis.

Roy H. Nelson, transferred to Hubbard, Ohio, as assistant superintendent of the Hubbard Furnace of the YOUNGSTOWN SHEET & TUBE CO.

Alfred B. Hebeisen, appointed as staff adviser on personnel procurement for the DRAVO CORP., Pittsburgh.

Thomas W. Norton, appointed advertising manager of U. S. STEEL SUPPLY CO., Chicago.

W. H. Millan, appointed district engineer for the WEAN EQUIPMENT CORP., Cleveland. Other appointments: **W. E. Heineman,** formerly production manager; **R. P. Popp,** formerly assistant purchasing agent; **I. W. Spraitzar,** formerly associated with the Wean Engineering Co., Inc.

William F. Arnoldy, appointed as special representative of the TOWNSEND CO., New Brighton, Pa.

Arthur T. Bennett, joined the H. K. FERGUSON CO., New York, as manager of operations for the Betania Alkali plant in Colombia.

Robert C. Tierney, named in charge of the new vertical turbine pump plant at Succasunna, N. J., of the WORTHINGTON PUMP & MACHINERY CORP.

Earl C. Miller, named executive assistant to the president; **M. L. Cramer,** promoted to sales engineer; **Emerson J. Tenpas,** development engineer, and **W. L. Lukowski,** design engineer of the ERIEZ MFG. CO., New York.

Stella R. Ellis, advanced to chief chemist for HUNT-SPILLER MFG. CORP., Boston.

Gordon D. Zuck, elected vice-president in charge of sales of INLAND STEEL CONTAINER CO., Chicago.

Otto M. Konrath, appointed general production manager of LYON METAL PRODUCTS, INC., replacing **C. T. Everett,** who has resigned. Mr. Konrath will supervise production at both the Aurora, Ill., and York, Pa., manufacturing plants, and is succeeded by **Leo Tilly** as Eastern sales manager.

Harry A. Hillman, appointed director of employment costs for the WESTINGHOUSE ELECTRIC CORP., Pittsburgh. Formerly director of payroll accounting, Mr. Hillman will be succeeded in that position by **Russell B. Read.**

Max Pressler, joined the COMMERCIAL METALS CO., Dallas, as manager, scrap iron division, effective May 15.

Edgar A. Berry, elected vice-president in charge of procurement of FARM TOOLS, INC., Mansfield, Ohio.

OBITUARIES

William G. Mather, 93, honorary chairman, Cleveland-Cliffs Iron Co. His death ends an association with the company of more than 70 years.

A. P. Ross, vice-president of the Ross Carrier Co., Benton Harbor, Mich.

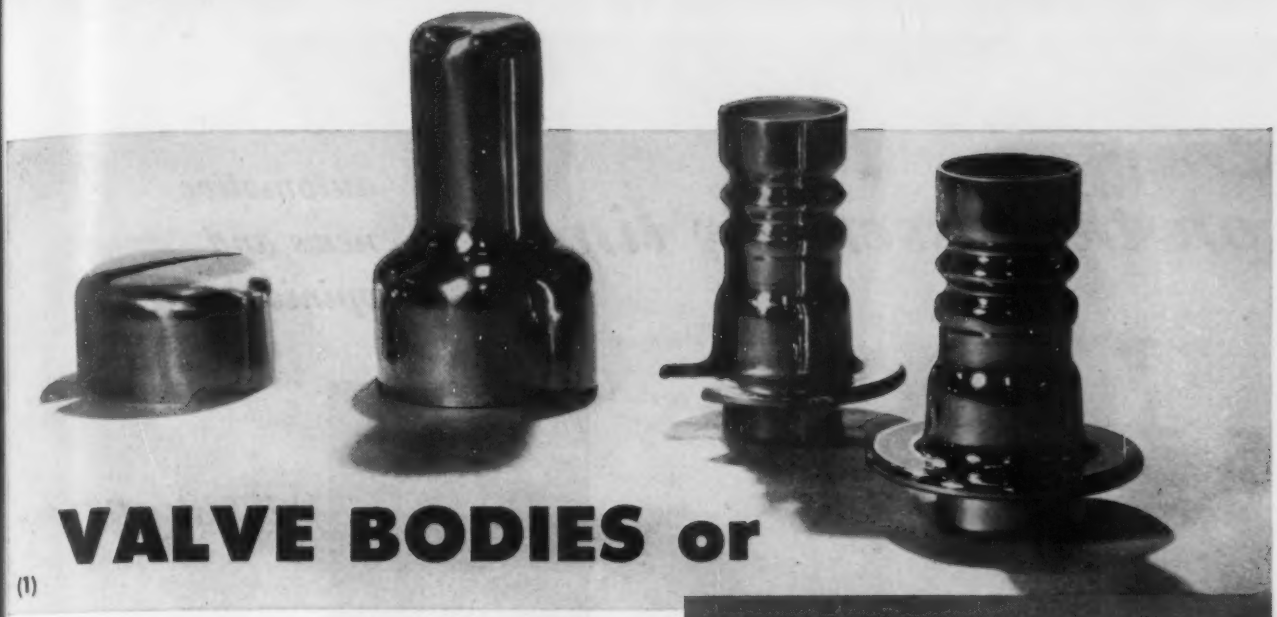
Sidney Wolfe, 80, founder, chairman of the board and governing director of Wolfe Electric Tools, Ltd., London.

Alfred Neuffer, contracting manager, Los Angeles, fabricated steel construction division, Bethlehem Pacific Coast Steel Corp., Lima, Peru.

Elliott D. Harrington, vice-chairman and secretary of the defense projects and priorities committee of General Electric's small and medium motor divisions at Schenectady, N. Y. He was 54 years old.

George G. Adams, New England sales engineer, machine division of the Osborn Mfg. Co., Cleveland. At his home in Ridgewood, N. J. He was 49 years old.

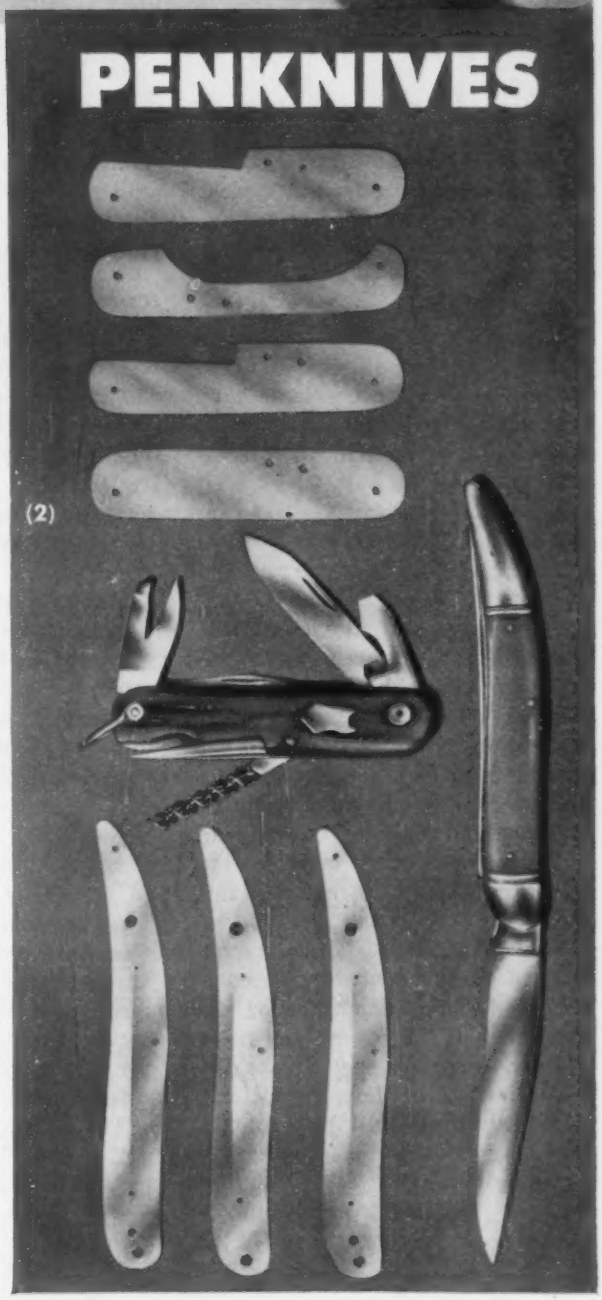
Victor F. Dewey, 75, former president of the Detroit Steel Products Co. At his home in Pasadena, Calif., after a short illness.



VALVE BODIES or PENKNIVES

(1)

(2)



How Two Manufacturers Improved Their Products . . . Pared Their Production Costs

(1) This illustration shows only four steps in the manufacture of a valve body from Revere 70-30 Cartridge Brass by Eastern Tool & Stamping Co., Saugus, Mass. Eastern was asked to quote on making this body as a stamping, to replace a casting. Due to the design of the part, it was felt that it would be especially difficult to produce from brass strip. Hence Revere was asked to collaborate on specification and fabrication. A close study of the fabrication steps resulted in the recommendation of 70-30 brass in a certain grain size. The latter is kept under control by Eastern through only two intermediate anneals. The result is a most unusual drawn and formed part, lighter, better, and more economical than the former casting. (Revere has no objection to castings as such. The important thing is to use them only if they are more economical and satisfactory.)

(2) Penknives, fisherman's knives and similar items made by the Utica Cutlery Company, Utica, N. Y., contain liners of brass which provide the proper clearances between the blades. These not only have to be blanked to the proper shape, but also must be punched with small holes for the rivets. Some of the holes must be "punched clean" with a minimum amount of burr. Others are produced with a blunt punch so that the metal is extruded slightly around each hole. The Revere Technical Advisory Service was consulted, with the result that Revere now supplies brass in a temper which blanks cleanly, but which also produces the exact amount of extruded metal around the desired holes in the customer's operation. In this case, it was proper temper which eliminated rejections and added to the quality of these already fine knives.

• These two cases are typical of the results obtainable when Revere and a customer sit down together to share their knowledge with each other. In these times, when more and more companies are planning to switch to Defense Orders, such collaboration can be exceptionally valuable. May we work with you?

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on the assembly line

automotive news and opinions

High compression engine tooling programs move ahead . . . Bar shortage more critical . . . Defense needs high.

by Walter G. Patton

Still May Come—Despite CMP, there is still a possibility that many of the new high compression engines for passenger cars may be available this year. Tooling for these engines was started many months ago. Some programs are nearing completion. Machines are often being built, side by side, with equipment urgently needed for defense.

Included in the list of new high compression, overhead valve engines are DeSoto, Dodge, Ford 6, Ford 8, Lincoln, Mercury, Ford tractor and Buick. All but the last two are now given an even chance —provided the necessary materials are available and CMP directives do not interfere. Pilot production of the new DeSoto engine by June is a possibility. Production of the new Ford 6 engine at Cleveland will, of course, depend on progress of construction at the new Ford-Cleveland plant.

Hold That Line—It is not possible to check accurately automobile production schedules for the remainder of the second and third quarter. However, spot checks disclose that, with few exceptions, strong attempts will be made to hold the present passenger car assembly rate.

Truck schedules are actually being boosted in some cases. With the prospect of a cut of as much as 67 pct on alloy steel for the third quarter (as compared with the base period), it is difficult to see how the automakers can meet these schedules.

Bar Steel Troubles—The industry's growing shortage of bar steel, both carbon and alloy, is not finding an easy solution through conversion. This was the method employed to alleviate the flat-rolled steel shortage. For one thing, rolling capacity is not as plentiful as in the case of sheet steel.

Another serious problem is steel quality. There can be no compromise with the quality of steel used for such vital parts of an automobile as steering knuckles, steering arms, axles, and highly stressed shafts.

Can't Be Juggled—Some compromise with quality was possible in selecting steel to be used for stampings. Top quality steel was assigned to highly stressed stamped parts or where a deep draw was involved. Inferior material could often be diverted for small, relatively low-stressed stampings.

The opportunity to juggle alloy and carbon bar steel in an automobile is practically non-existent. All must be top quality material.

Most Critical Now—It is doubtful if bar steel shortages have been any more critical at any time during the entire postwar period than they are now in the automobile industry. Producers are being called on by many of their vendors to furnish steel bars. Prominent auto parts producers report bolt steels, for example, are particularly unobtainable. All sorts of changes in specifications are being made to meet existing shortages.

Typical applications for bar steel in an automobile includes steering knuckles, steering arms, axle shafts, transmission shafts, gears and pinions, leaf springs and coil springs. An average passenger car requires more than 600 lb gross of bar steel. From 25 to 45 pct of the bar steel may be alloy.

They Also Serve—Playing an important part in the defense program are the metallurgists serving on the Iron and Steel Technical Committee of the SAE. Representatives of the automobile industry, aircraft industry, steel companies and Armed Services have been meeting regularly to find ways and means to solve the present alloy shortage.

Seven men have guided the work of the SAE Technical Committee through 27 of its 42 years of existence. These men include F. P. Gilligan, Southern Engineering Co.; W. P. Eddy, Pratt & Whitney Air-

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Ore for Japan — As iron ore moves in from South America and efforts are being made to get the last ounce of metal from taconites, western ores are moving out of the country.

Nevada and Utah ores are either now on the way to Japan or under negotiation for export. Movements continue through Long Beach and contracts for hundreds of thousands of tons to pass through the San Francisco Bay region are expected within a week or two.

Pig Moves In—While ore moves out, pig moves in from foreign furnaces. Last week 6000 tons of Chilean pig was unloaded in Los Angeles to be sold at $67.00 per gross ton with plenty of takers, and 6000 tons of Dutch pig was being delivered at the 1950 contract price of $48. Another 3000 tons of Dutch pig was to be unloaded in San Francisco this week at the same price.

A "telephone" salesman has been offering Los Angeles foundries Dutch pig at $102 per metric ton but getting no takers. Whether this is a black market deal depends on the price these same operators were offering for the same material during the base period. Legitimate importers don't like it.

Production Stops — Isaacson Iron Works in Seattle, which has been producing ingots for both Kaiser Steel Corp. and Geneva Steel Co. in two electric furnaces, had closed down last week because of the machinists' strike.

Furnace men refused to pass picket lines. Heretofore, scrap and power shortages have held up production and during the shutdown inventories will be built up to permit capacity operation when the strike is ended.

Veteran Recalled—After lying in the desert sun 38 years and carrying enough oil to drive all the steam powered trains in the country for a year, an 8-in. line of steel pipe is to be dug up. The pipe will be reconditioned and put back in service by General Petroleum Corp. in central California.

More than $2 million will be spent in this salvage operation made economical by the price of pipe and its scarcity. Bechtel Corp. will dig up the 43 miles of pipe. It will be relaid between San Ardo oil field and the sea to carry crude. Addition of light oil and heat will make the San Ardo oil transportable by pipe line for the first time.

Die Hards—Labor is determined some part of the government's shipbuilding program shall be carried out in the West. Last week labor leaders announced they were working to form a cooperative group to build ships without profit and assure members employment.

The project hopes to secure an RFC loan of $150 million to finance initial operations in the San Francisco Bay area.

Federal Warehouse—One of the largest general warehouses in northern California will be erected by the General Warehouse Co. in South San Francisco and leased to General Services Administration.

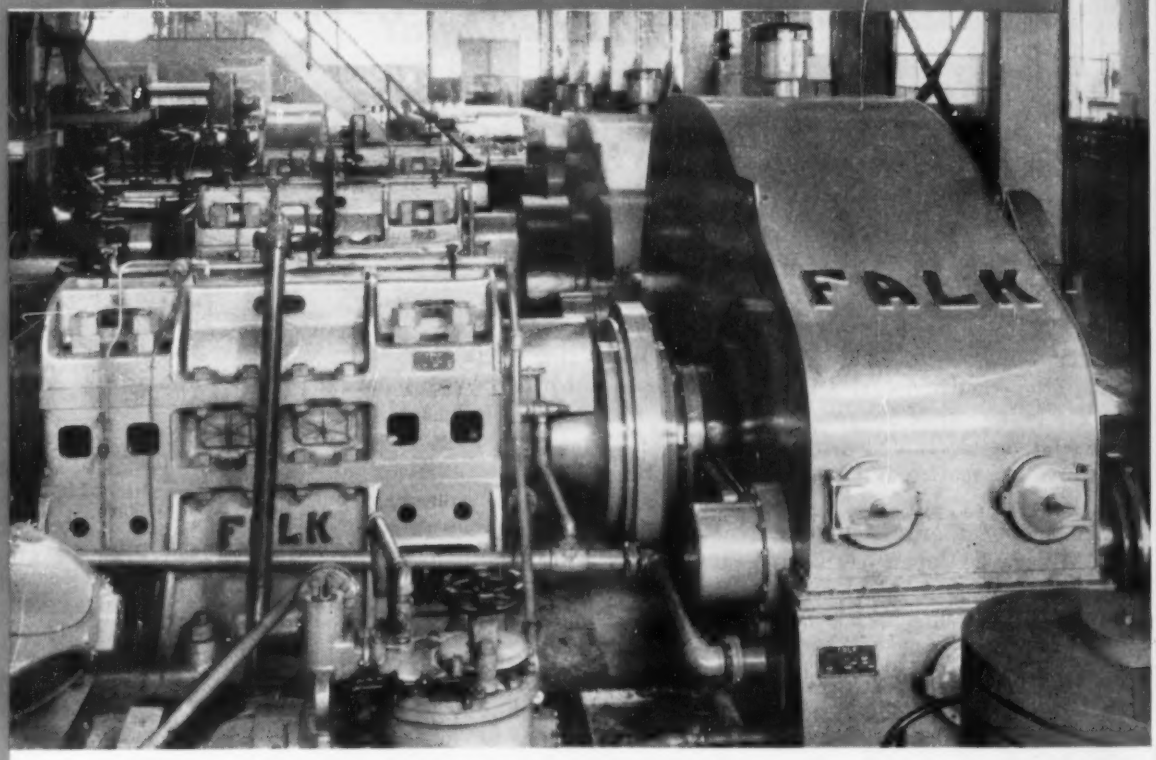
To cost $2 million, the structure will be erected on a 20-acre tract and serve 321 offices of Federal agencies in the West and Pacific islands. There will be approximately 570,000 sq ft of floor space.

Plans to Expand — Structural Steel & Forge Co., now mid-way in a $1½ million expansion program at its Sale Lake City plant, is planning an additional $250,000 expenditure to increase facilities at its plant where roof deckings and steel door frames are made.

Lane Steel Organized—To specialize in furnishing and placing of reinforcing steel, the Lane Steel Corp. has been organized in Eugene, Ore. Principals are: Tauf Charneski, Henry Werner, L. H. Williams, and Dan Tonn.

Heat Is Off — Officials of Los Angeles County Air Pollution Control District have granted Axelson Mfg. Co. permission to continue to operate its gray iron foundry in Vernon, Calif., through Jan. 30, 1952, due to the fact that smog control equipment is on order.

THE INSIDE STORY OF . . . BETTER GEAR PROTECTION



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A Texaco Lubrication Engineer will gladly help you select the proper lubricants for savings throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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FOR STEEL MILL GEAR DRIVES

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

the federal view

this week in washington

by Eugene J. Hardy

Government-Built Plants — The Administration still wants authority to build government-owned plants, but apparently it will now confine its request to strictly arms plants.

Periodic bids by President Truman for authority to build steel and other basic plants have been successively beaten down by Congress, but now Mr. Truman's advisors want to open the door by building plants that would have no normal peacetime use.

Sound Procedure—Defense Production Administrator W. H. Harrison says the Administration will ask for this authority in the new Defense Production Act and defends it as "sound procedure." He told the Joint Defense Production Committee that such authority would be limited to such things as guided missile plants and machine tool building for strictly arms purposes.

Still, some of Mr. Truman's advisors would like the government to go all the way in building plants, holding that this course of action is scheduled to follow issuance of certificates of necessity and direct government loans.

Price Orders Due—Price control over manufacturers, a move now due within a few days, will permit nearly all post-Korea cost increases to be added to pre-Korea base period. Manufacturers are to be permitted to select any pre-Korea quarter as base.

Another pricing order, setting specific ceilings on machine tools, is scheduled to follow issuance of the manufacturers' pricing order "within a matter of hours."

Government price stabilizers actually were ready to clamp down on manufacturers months ago, but magnitude of the task (between 200,000 and 300,000 manufacturers are involved) delayed the final draft of the order.

Get Tough Phase—Price Administrator DiSalle hints that the "get tough" phase of enforcement is at hand. Compliance orders to date have been limited to a handful of enforcement orders against the most flagrant violators of OPS orders, but the 20 investigating teams now operating are about to unloose a rash of compliance orders.

Incidentally, the mushrooming growth of the Office of Price Stabilization and its regional and district offices can be gaged by a recent top-office estimate that the agency will have 16,000-odd employees by June 30.

New Steel Query — From one agency or another, the steel industry will soon be receiving questionaires asking for data on steel shipments to subsidiaries, fabricators, and various classes of consumers.

Federal Trade Commission Chairman James M. Mead says that an FTC questionnaire is now awaiting clearance in the Budget Bureau. Purpose of the questionaire, according to Mr. Mead, is to "show whether or not independent steel fabricators are being unnecessarily injured by diversion of steel to the integrated fabricating plants of their suppliers or to their large competitors."

Budget Bureau is attempting to decide how much of this data will be gathered by agencies such as NPA. If any of the defense agencies gather this information fully, FTC will use their reports and supplement them if necessary.

Auto Freeze—There is still a lot of talk about a government freeze on 1952 model automobiles. NPA admits that something is in the wind, but warns reporters not to "go out on a limb." The possibility of a freeze on production of tools, jigs and dies is being talked about, but with much of this work well past the preliminary stages such action would be something like locking the barn too late.

More likely happening is a freeze on actual models which would bring about much the same effect without imposing any serious production handicaps on the industry.

For that matter, anything that is done will be largely to satisfy politically-inspired screams about the high production rate of the auto industry.

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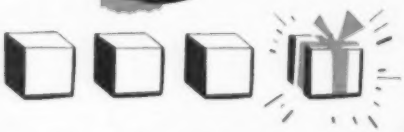
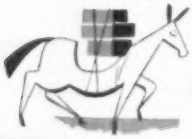
Whether you make dragline buckets  feed troughs  truck trailers  with Inland **HI:STEEL**, you can retain the same structural strength  yet save enough steel on every three units to fabricate a fourth one!  Where payload is important  extreme strength and elimination  of deadweight essential **HI:STEEL** is the answer. When you must make your product stronger  or make it lighter  or make it last longer  without increasing your steel tonnage **HI:STEEL** is the answer. **HI:STEEL**'s yield point  is nearly twice as high as ordinary structural-grade carbon steel, plus superior notch toughness and fatigue strength. **HI:STEEL**'s resistance to atmospheric corrosion  is four or five times as much as ordinary carbon steel. Abrasion resistance  may be improved as much as 12 times  over ordinary carbon steel, depending on the abrasive medium. No change in shop practice  is ordinarily required when fabricating **HI:STEEL**.

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THE IRON AGE
FOUNDED 1855
FEATURE ARTICLES
foundry issue

By William Czygan
Associate Editor

MACHINES make shell molds automatically

Recent advances in the field of shell molding presage a new era in sand casting technology. High-speed automatic machines for making precision shell molds are now in use, making quantity production of castings with exceptional physical characteristics and dimensional accuracy a reality. Added to the other imposing advantages of this process (THE IRON AGE, Aug. 3, 1950, p. 89) the new techniques and equipment are hailed as probably the greatest foundry developments of modern times.

While shell molding has only lately gained stature among important industrial processes, the underlying fundamentals are not new. The idea of making a shell mold can be traced to the inception of various precision casting techniques in current use. In such processes, expendable patterns are first precoated by dipping in a mixture of silica bonded with high refractory materials so as to form a shell. This shell is then in effect backed up when the final refractory mold is formed around the precoated pattern.

Early in the postwar period, A.R.D. Corp., New York, began investigations on cooling rates in refractory molds. It was found that one means of controlling cooling rate was to vary the thickness of the mold wall; this also initiated further study of the possibility of producing thin-walled or shell molds.

Carrying the concepts of conventional precision casting a step further, attempts were made to eliminate the need for perishable patterns. However, high-refractory investment compositions presented a stumbling block, in that those which are readily manageable require an excessively long time to harden. While such compo-

Shell molding has emerged from the experimental stages to become an important production process. Semi- and fully-automatic machines producing upwards of 1500 molds in an 8-hr day are now in use, and units of even higher output are in the offing. Significant savings result.

While there have been many optimistic forecasts on the potential of the shell mold ("C") process when used with high production machinery, industry has been reluctant to yield information on actual technical progress. This IRON AGE article tells for the first time how high speed machinery has been applied to the process and may revolutionize foundry production in many cases where castings are needed in volume.

sitions are quite suitable for use with perishable patterns, they would require a large number of permanent metal patterns for any sizable production if the mold must be left on the pattern for an hour or more to harden.

An investment slurry was finally developed which would set rapidly at low temperatures. In a patent application dated Jan. 30, 1946 (Serial No. 664,420) for which patent No. 2,521,614 was granted Sept. 5, 1950, I. E. Valyi describes an investment composition of the usual type, but homogeneously incorporating a low-temperature bonding agent.

The bonding agent recommended is a resin of the urea-, melamine-, furane-, or phenol-formaldehyde type. Such resins offer a low degree of condensation and will polymerize to a final insoluble and infusible three-dimensional network in the presence of a catalyst. The slurry containing both the low- and high-temperature bonding agents and a catalyst is poured against permanent patterns and the resin is polymerized to set the mixture; it then has sufficient strength to be handled, after which the pattern can be removed and the mold is fired. The thermosetting resin therefore initiates a low-temperature bond, and final hardening is accomplished by the high-refractory substance.

Similar Trials in Germany

It was desirable to keep moisture content as low as possible in all of these slips or slurries, since the liquid acted only as a vehicle for getting the silica into the pattern contours. Moisture contents were steadily reduced down to levels of from 2 to 2½ pct. At this point, however, the mixture behaved neither as a liquid or as a dry material, and poor flowing characteristics resulted.

Apparently unknown to the American experimenters, developments of a similar nature had been undertaken by Johannes Croning in Hamburg, Germany. Herr Croning started with a slurry using only a resin bond, presumably one of the liquid phenolics. These experiments were directed at trying to pour a resin-bonded slip against a permanent metal pattern and pouring off the excess, thereby forming a shell in a manner similar to methods used in some ceramics practices.

Eventually, Croning hit upon the idea of entirely eliminating all moisture; the dry mixture then resulted in good flowability. Techniques employed with the dry mix of silica and resin were essentially the same as applied to the liquid slurries. The mixture was poured against the pattern and then heated to produce a low-temperature bond.

Methods and results achieved by Croning were first officially made known in the United States with the publication of Fiat Final Report 1168, PB 81284, issued May 30, 1947, by the Office of Technical Services, U. S. Dept. of Commerce. The report tied in with developments already going on in this country, and investigators here were coordinating the Croning data with their own in a matter of several weeks.

Time Cycle Shortened

Elimination of all moisture was immediately recognized as a sound principle. Although the methods described in the Fiat Report would produce a shell mold, they were found to be somewhat impractical and not readily adaptable to quantity production. The mold lubricants prescribed were poor and unworkable. Intensive research conducted by numerous companies showed that the resin-sand proportions were incorrect, as were the recommended temperature ranges for coating and curing. Also, the cycle described would have been too long, eclipsing any economic advantage offered by the process.

Industry next sought to determine how much the overall cycle per pattern could be shortened, and what possibilities existed for mechanization of shell molding. The hand-operated dump boxes used in initial trials were too slow, and it took from 2 to 3 min. to make a mold. In addition, the time of one man was completely occupied by mold-making, while another was needed for mold assembly and preparation for casting.

Further study indicated that shell molding lends itself better to mechanization than does ordinary sand casting. It was also found that the overall cycle per pattern, including baking, could be reduced to a practical minimum of about 50 sec. Machines of various types were designed that would perform the necessary operational steps in automatic sequence.

Machine Takes 3000-lb Pattern

The SU-1 shell molding machine, shown in Fig. 1, is produced by Shellmold & Machine Co., Inc., an organization formed by A.R.D. Corp. for the purpose of making such units. This single-station machine completes the cycle in from 50 to 70 sec. and has a molding area measuring 26x41 in. It accommodates patterns up to 3000 lb. in weight with a pattern plate thickness up to 3 in. Various steps in the sequence are: Application of parting to the pattern;

preheating of the pattern; coating the pattern with the sand-resin mix; curing the mold; stripping the mold from the pattern; and cleaning the pattern for the next cycle.

The pattern is clamped to the iron pattern adapter (1), usually by bolts along a center strip and two edges only; this permits the pattern to expand freely. The ejector pins are clamped to the steel ejector plate (2) by a clamping plate (not shown). Patterns are removed by simply unbolting the pattern adapter and the ejector clamping plate, then lifting the pattern out vertically.

Uses Economical Parting Agent

Parting agents are available that will permit several molds to be made between applications. However, these are not by far as economical as others that allow only one or two molds to be made per application. The machine is therefore arranged so that parting can be applied quickly and easily after every single mold, if necessary.

Parting is sprayed on from high pressure jets located in the catch and drain tank (4), which drains into a sump tank containing a pump. The return line from the drain tank to the sump passes a filter, and the pump connects to the pressure spray nozzles. The front cover of the machine is removable, exposing the drain tank for easy removal of any foreign matter that collects in it.

The drain tank is supported on a cantilever frame (6), and may be raised or lowered by means of a rack and gear transmission (5) or air cylinders. When the pattern is rolled over, facing downward, the tank is lifted up against the pattern by the rack and gear train. The rim of the drain tank has a heavy rubber gasket (7), which seals the tank against the adapter. Then the high-pressure pump (not shown) is started from the control station (28) and sprays the pattern, after which the pump shuts off and the tank is again lowered.

Preheating of the pattern is sometimes required to assure a constant pattern temperature. This is necessary because the coating dwell depends on the pattern temperature; also, the shell thickness as influenced by pattern temperature affects permeability and other properties of the mold, so care must be exercised in checking and controlling pattern temperature.

Offers Two Heating Methods

The SU-1 machine offers two possibilities for control of pattern temperature. One means is to apply either gas burners or electric cartridge heaters to the pattern plate itself; but since stripper pins are often found in unpredictable locations of the pattern area, this may not always be advisable. On such occasions, the better method is to insert the pattern assembly into the curing oven (8).

A connector leading to thermocouples in the pattern plate is arranged at about the middle of the wide side of the adapter, on the rim toward the oven when the pattern is face up. When the pattern moves into the oven, the connector engages a stationary socket bracketed to the outside and back of the oven; this establishes contact between the temperature-sensing element in the pattern and an indicating or control instrument, so that pattern temperature may be read during preheating. The device may be arranged to automatically shut off when a preset temperature is reached.

For the coating operation, the pattern is first positioned under the sand hopper (3), face up. The sand hopper contains a set of louvres located 12 in. above the pattern face and running across

OPERATING SPEED IN SU-1 MACHINE CYCLE*

Operation	Time, sec	Per Cycle	Total Time Per Cycle, sec
Hopper up or down	2	2	4
Louvres open or close	½	2	1
Roll over or back	2	2 or 4	4 or 8
Pattern carriage—advance or return	2½	2 or 4	5 or 10
Drain tank up or down (eject; spray)	1½	2 or 4	3 or 6

Total: Cycle, including operating spray and preheat, 29 sec; Cycle not including preheat, 17 sec.

* Functional dwell periods (coating, curing, preheat) not considered. Operations not listed are simultaneous.

Advantages of shell molding

1. *Dimensional accuracy; tolerances of a few thousandths of an inch are possible.*
2. *Exceptional permeability, facilitating gas escape; permits casting sections as thin as 0.010 in.*
3. *No significant warpage, even in light sections.*
4. *Accurate reproduction of pattern surface; extreme smoothness can be obtained. Machining and finishing are reduced.*
5. *Mold has no affinity for moisture, can be stored indefinitely.*
6. *Sand preparation is greatly reduced; sand volume is reduced about 90 pct.*
7. *Less labor and floor space required for a given mold production.*
8. *Both ferrous and nonferrous metals can be cast in shell molds.*
9. *Less risers and gating are needed, reducing the amount of metal that has to be melted. Also makes less back scrap to handle.*
10. *Cleaning of the casting is minimized.*

the long side of the hopper. The louvres are operated by a gear train (9), actuated by an air cylinder (10). When closed, the louvres hold the sand mix in the upper part of the hopper.

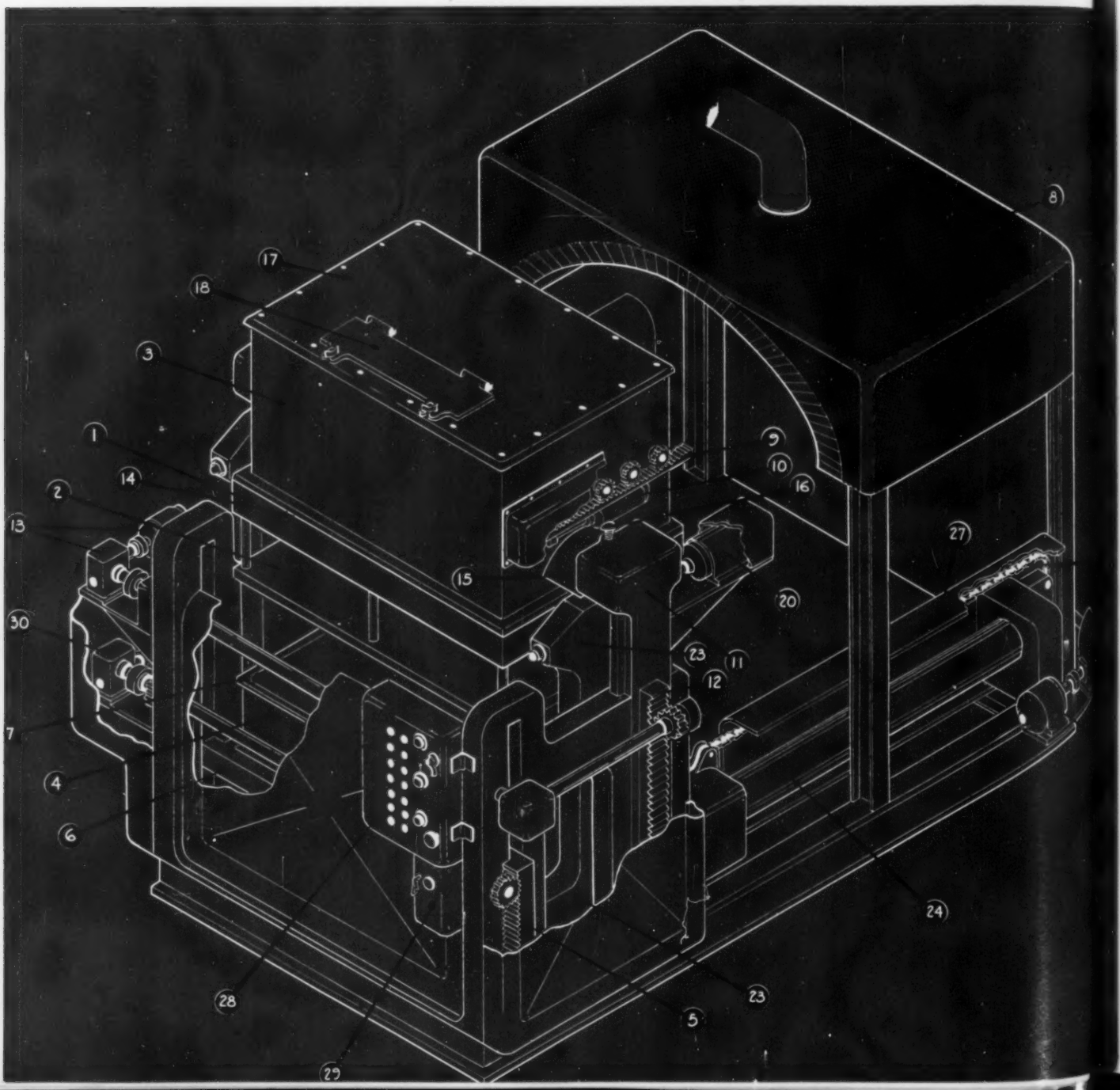
The entire hopper assembly is next lowered over the pattern by means of a frame (11) operating on a rack (12) and controlled by a 3-hp electric motor and gear reducer (13). An elastic seal (14) is provided at the face of the sand hopper adjacent to the pattern. The louvres are opened and the sand mix drops onto the pattern, remaining in that position for the length of the coating dwell, which is preset by timer in the control station (28).

When the coating dwell is completed, the mold-turning mechanism shown in Fig. 2 comes into play. The rack (19), actuated by an air cylinder (20), acts upon a gear (21) which is attached to the turning shaft of the pattern adapter. The rotary motion imparted to the pattern adapter forces the segment (15), attached to the sand hopper, to enter a circular guide rail (22) which is part of the pattern carrier (23). Thus, clamping is continued during roll-over and the sand hopper remains attached to the pattern.

Assembly Rotates Back

Upon rolling over, the excess sand drops back into the hopper and the louvres are again closed. The assembly is then rotated back to its original position and the frame (11) raises the sand hopper approximately 14 in. to its starting posi-

FIG. 1—The SU-1 shell molding machine (patent applied for) measures 6 ft wide, 9 ft long and 7 ft 6 in. high and gives high production of molds in a small amount of floor space. Controls may be arranged for completely automatic operation.



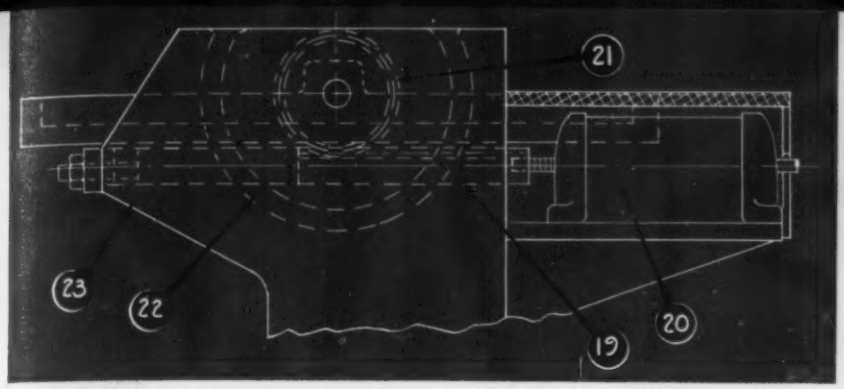


FIG. 2—Details of the mold turning mechanism used on the single-station SU-1 machine. The sand hopper remains clamped to the pattern during rollover.

tion, where the locking pin (16) engages.

After the sand hopper is elevated, the pattern with the adhering sand coat is conveyed into the curing oven by means of a carriage (23). This carriage moves on guide rods (24) and is operated with a sprocket and chain drive (25), driven by a 3-hp motor and gear reducer chain (26). A timer then controls the length of pattern dwell in the curing oven.

The pattern comes out of the curing oven right side up and moves to the operating station. If stripping the pattern face-up is desired, the drain tank is raised until it contacts the ejector plate; this movement is continued until the mold is stripped clear of the pattern.

Ejection with the pattern face-down is accomplished by rolling the pattern over and lowering the sand hopper so that the hopper frame contacts the ejector plate, pushing it down until the mold is stripped clear. An ejecting attachment that permits complete discharge of the mold from the machine is available for use with this method. Otherwise, the mold is left resting upon the ejector pins until the operator removes it by hand. The pins move throughout their full length in order to lift the mold shell above the highest point of the pattern.

Unit Is Fully Automatic

The pattern is cleaned by means of air jets, just before the parting is applied. The jets are built into the drain tank and are turned on by a solenoid valve just before the pattern comes into contact with the tank.

Several different control systems may be incorporated into the machine, ranging from individual push-button control to semi- or fully-automatic operation. In the fully-automatic cycle, the individual cycles are all connected and interlocked. The operator presses the start button, whereupon all of the functional operations of the machine take place until a mold is ejected, remaining on top of the stripping pins in the raised position. The operator then removes the mold and pushes the start button again for another cycle. Approximate operating speeds in the fully automatic cycle are listed in the accompanying table.

In viewing the overall potential of shell molding mechanization, such single-station machines are considered relatively slow. However, one man can make the shells, set cores, inspect, and assemble the molds for pouring if the machine is completely automatic. This one man then does the work of the several usually required for equivalent production by ordinary molding methods. Furthermore, the 50 to 60 complete molds per hour produced with the machine exceeds the best efforts in automatic sand molding.

Sand costs in shell molding remain about the same. Although a comparatively high percentage of resin is required, this method uses only about 10 pct of the sand needed in sand molding. Sand handling and conditioning is therefore greatly reduced. From a handling standpoint, the sand-resin mix is somewhat touchier. Because of the differing specific gravities of these materials, some care must be exercised to prevent segregation of the two dissimilar solids.

Multi-station Machines Exist

The slower cooling characteristics of the shell mold make it possible to use less risers and gating. This results in melting less metal and carrying around less back scrap. All of these factors, when coupled with the higher production rate from a reduced labor force, result in very impressive savings.

Details on resin-sand ratios and temperatures being used for large-scale production are still closely-guarded secrets in most quarters. However, it is known that some companies have advanced beyond the pilot plant stage and are in quantity production on various automotive components and pipe fittings.

Multi-station machines are in existence which still further reduce the overall time required for making shell molds. Such units have all operations controlled independently and automatically with a complicated system of interlocking controls. Fewer operators are required than for an equivalent number of single-station machines. One 8-hr day's production on such multi-station equipment approaches 2000 molds, and units of even greater output are anticipated in the future.

The shell molding process does have many variables and limits, and the foundry industry is faced with a whole new technology. However, these variables may turn out to be fewer than those encountered in ordinary sand casting, and have been found easier to adjust.

Improved tests evaluate
NODULAR IRON

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Mechanical properties of nodular iron obtained from keel block tensile specimens can be misleading and should be appraised judiciously. Because of the section sensitivity of nodular iron, test specimens are needed which are closely representative of the actual casting. For section 3/4 in. and under, the standard ASTM 0.625-in. diam malleable test bar is suggested.

During the past 2 years an extensive experimental investigation of nodular cast iron has been conducted at Southern Research Institute, Birmingham. This investigation, sponsored by the Malleable Founders' Society, has as its objective a practical evaluation of nodular cast iron. The scope of the investigation has been quite broad including studies of numerous nodulizing agents, base iron compositions, and thermal treatments of the new material.

Before presenting experimental results, it is desirable to establish an equitable basis for comparison between the two materials. This is not easy, since it involves a consideration of the whole philosophy of test coupons for cast metals.

Many conclusions have been drawn concerning the relationship between the various types of test coupons and castings poured from the same heat of metal. In cases where the test coupon is very similar in size and shape to the casting it represents, properities of the casting will usually correspond closely to those of the test specimen. In other cases where the casting and test bar are dissimilar in size and shape, it is virtually impossible to duplicate test bar properties with specimens machined from the casting. This difference is even more pronounced where castings are made of metal having pronounced section sensitivity, as is the case with nodular iron.

As long as differences between test bar and casting properties are well known and understood, no serious difficulties are encountered in the specification and performance of such castings. But the use of test bar properties as criteria for casting performance where unknown differentials may exist can lead to dangerous situations. In this connection there is an urgent need for closer correlation and better understanding of test bar and casting properties when comparing nodular iron with malleable.

For example, Laufer[1] indicates that magnesium-treated nodular iron can be regularly produced in sections varying from 3/32 to 1 in., and cites several examples of such castings with sections as thin as 1/8 to ¼ in. Although he admits that such thin-walled castings seldom have any ductility as-cast and actually contain free carbides, he nevertheless bases his tensile data on heavy keel blocks where free carbides are very unlikely to occur.

Keel Block Tests Are Misleading

In discussing proposed specifications for nodular iron, Gagnebin[2] states that "with certain favorable base iron compositions it is possible to obtain the following properties in the as-cast condition: yield strength 55,000 to 62,000 psi, tensile strength 72,000 to 85,000 psi, elongation 9.0 to 15.0 pct, hardness 170 to 195 Bhn." While Gagnebin mentions that these are keel block properties he does not indicate that any difficulties would be encountered in obtaining equivalent properties in as-cast lighter sections.

MacKenzie[3] refers to the same comparison of properties in the following comment: "Statements have been made that nodular iron is tougher than malleable, but as far as this writer

can see the comparison has been made between nodular iron keel blocks and the standard malleable iron test bar (which is tested as-cast and after heat treatment). This is obviously unfair to malleable iron."

The current investigation at Southern Research Institute indicates that comparing nodular iron properties from heavy keel block specimens with malleable iron properties from 0.625-in. diam in cast specimens does not give a true picture. The keel block specimen, borrowed from the steel and bronze casting industries[4], possesses ideal solidification characteristics; it tends to eliminate all difficulties arising from non-uniformity of structure such as chilling, shrinkage, or cope-side segregation, all of which are frequently encountered in nodular cast iron.

The standard malleable test specimen (ASTM-A47-48) consists of a 0.625-in. diam bar which is tested without machining. Figs. 1 and 2 show the relative sizes of the two types of specimens. Obviously, the 0.625-in. diam cast specimen is far more representative of typical malleable castings than are the 20 to 30-lb keel blocks usually employed for nodular iron. Experience has shown that nodular iron specimens machined from keel blocks show substantially better properties than specimens of the same nodular iron in the form of 0.625-in. diam cast specimens.

Conversely, standard malleable iron properties are not reduced by decreasing section thickness so that the mechanical properties for typical ¼ to ½ in. sections in malleable iron castings are, if anything, better than indicated by the test bar. Tests have shown that the 0.625-in. bar fairly represents actual properties in malleable iron castings up to 1 in. section thickness.[5]

Chilling Tendency Is Reduced

Keel blocks employed for nodular cast iron generally possess two parallel keels or rib sections approximately 1 x 1 in. in cross section by 6 to 8 in. long, cast integrally with a heavy slab of approximately square cross section. The mass of the keel block casting indicates that its solidification characteristics probably approximate those of a 2-in. square block 6-in. long.

The specimen is usually molded in dry sand with the top open. Variations in this procedure include green sand molding with split patterns, and similar blocks having a single rib or keel along the center of the slab. In any event, the solidification characteristics of the keel block are ideal for producing sound metal with more than adequate feeding and relatively slow cooling.

Due to the relatively large volume of metal (average weight 20 to 30 lb) and comparatively slow cooling rate, the use of keel block specimens minimizes the rather pronounced chilling tendency normally associated with nodular cast iron. It also eliminates cope-side segregation effects, since test bars are machined from the extreme base of the block. Consequently, mechanical properties that are obtained from the keel block

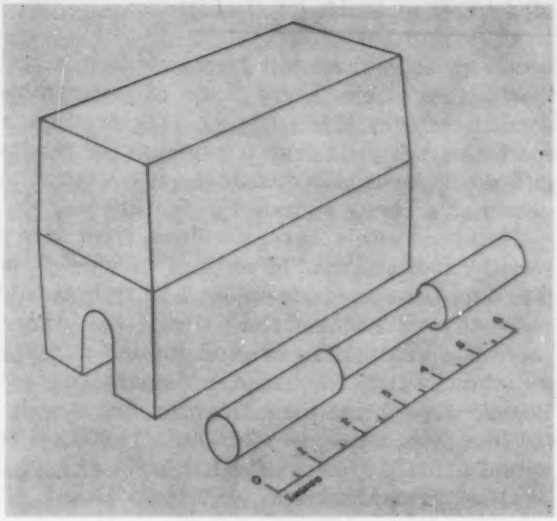


FIG. 1—Typical keel block specimen compared with ASTM A47-48 0.625-in. diam cast tensile specimen. The latter is more representative of malleable castings than the larger keel blocks generally used for nodular iron.

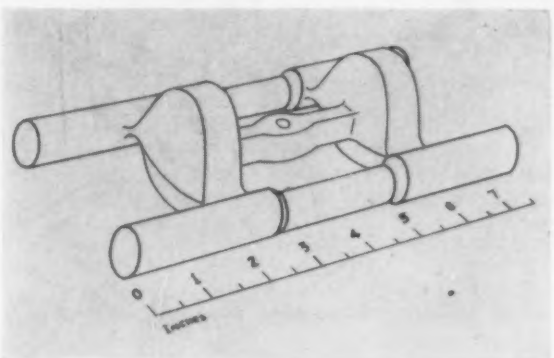
tensile specimens must be appraised judiciously.

In addition to the keel block, nodular cast iron specimens for testing as-cast are sometimes produced. Of this type, specimens ranging from the standard 0.625-in. diam malleable tensile bar to 1.20- or 2-in. diam rounds for traverse bend tests have been studied. Specimens tested in full cross section without machining are far more likely to show up discontinuities and characteristic defective conditions of the metal than are specimens machined from sound metal produced under ideal conditions.

While good properties have been reported from as-cast specimens, it is nevertheless true, that average results from such specimens fall considerably below keel block averages. Moreover, nodular cast iron properties obtained from as-cast bars are usually much less consistent than those obtained from keel blocks.

In order to evaluate properties of nodular cast iron in heavy sections, 2-in. and over, it is

FIG. 2—Complete gate of ASTM A47-48 cast tensile specimens. Such specimens are shown to fairly represent actual properties in malleable iron castings up to 1 in. section thickness.



necessary to machine test specimens from actual castings or from heavy bars of comparable section cast for this purpose. This practice is most likely to yield truly representative results and should be employed wherever it is desired to obtain an accurate appraisal of properties.

Tests on tensile bars machined from heavy sections indicate that in sections ranging from 2 to 6 in. there is considerable stability in tensile properties of nodular iron; above that range there is a gradual loss of strength and ductility as the sections increase. Vennerholm and Bogart[6] report that their "high ductility" nodular iron as-cast possesses 70,000 to 75,000 psi ts with 7.5 to 11.0 pct elongation in 1- and 2-in. sections. In 8-in. sections, 40,000 psi ts and 2.5 pct elongation are listed.

Step Bars Give Valuable Data

In addition to tensile specimens, it is frequently desirable to produce specimens for examining the microstructure of nodular cast iron in varying section thicknesses. For this purpose, the conventional step bar type specimen shown in Fig. 3 was used. In nodular cast iron a tendency towards excessive chilling in thin sections and a reversion to flake graphite in heavy sections must be guarded against. Utilization of the step bar to detect undersirable conditions of the metal through micro-examination of different sections is therefore a valuable adjunct to the tensile specimen.

In this experimental investigation of nodular cast iron, every effort was made to comply with the best practices for obtaining consistently good results. Careful control was maintained of base iron analysis, melting and molding practices, and method of adding nodulizing agents and inoculants. All of the experimental heats were induction furnace melted and test specimens were molded in green sand employing a high grade facing sand.

Numerous 30-lb heats were produced in the initial phases of the project, followed by a series of heats ranging between 100 and 250 lb in the later phases of the work. A variety of test specimens was produced for comparing the behavior of nodular cast iron in different sections. Typical specimens included the standard malleable 0.625-in. tensile bar (ASTM A47-48) a 20-lb keel block, a step bar ranging from 3/16 to 1¼-in. and in several heats, heavy section specimens 4 x 4 x 24 in., cast vertically.

The effect of variation in section thickness on tensile properties of nodular cast iron is shown in Table I, where typical test bar properties for three types of specimens are compared. The 0.625-in. diam (ASTM A47-48) as-cast bar shows

FIG. 3—Step bar specimen used for correlating hardness and microstructure with section thickness. The accompanying micrographs (100X, Nital etch) illustrate microstructures in heat No. 89 (See Table II) nodular iron.

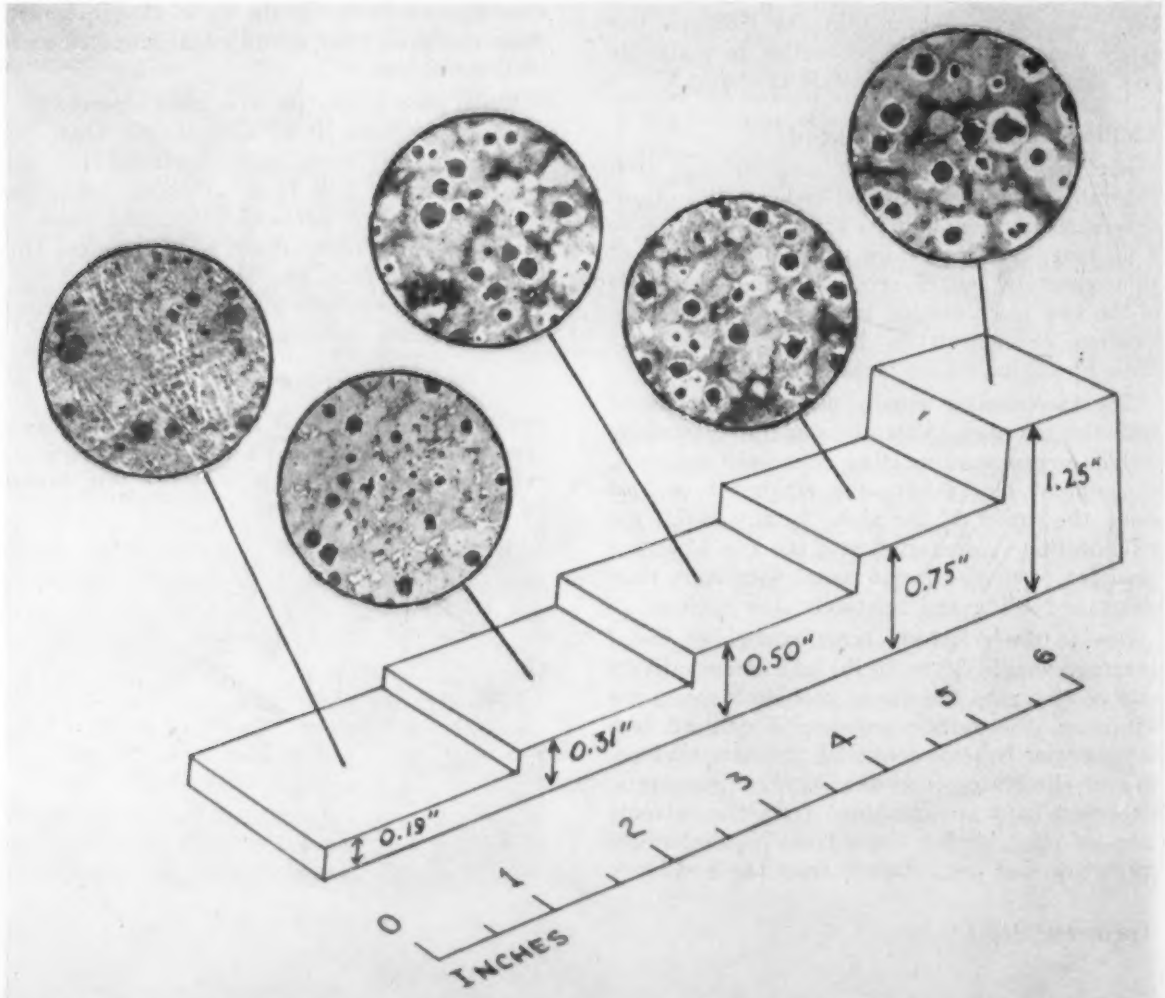


TABLE I

TEST BAR PROPERTIES FOR NODULAR IRON*

Heat No.	Test Bar Type	Ultimate Tensile Strength, 1000 psi	Yield Strength, 1000 psi	Elong., Pct
64	A47-48[a]	84.7	72.0	2.0
64	Keel Block	92.1	63.2	4.8
60	A47-48	61.5	....	0
60	Keel Block	61.1	44.7	13.8
95B	A47-48	89.6	56.9	2.3
95B	4 x 4 x 24 in.	95.1	56.4	5.2

Chemical Composition, Pct

Heat No.	T.C.	C.E.[b]	Si	Mn	S	P	Mg	Nodulizing Agent
64	3.72	4.70	3.25	0.36	0.011	0.037	0.041	70-30 Cu-Mg Alloy
60	3.87	4.70	2.73	0.14	0.019	0.026	0.015	60-40 Ce-Mg Alloy
95B	3.50	4.18	2.21	0.36	0.009	0.04	0.091	60-40 Cu-Mg Alloy

* No thermal treatment.
[a] ASTM A47-48 as-cast tensile bar 0.625 in. diam.
[b] Carbon Equivalent = T.C. plus 0.3 (Si and P)

TABLE II

EFFECT OF SECTION THICKNESS

Heat No.	Section, in.	Hardness, Bhn	Microstructure[a], Pct Cementite	Pearlite	Ferrite
89	0.19	340	20-30	70-80	0
	0.31	302	10-20	80-70	0-10
	0.50	293	0	80-90	5-15
	0.75	269	0	80-90	10-20
	1.25	255	0	80-90	10-20
	4.00	170	0	70-80	20-30

Chemical Composition, Pct

T.C.	C.E.[b]	Si	Mn	S	P	Mg
3.73	4.59	2.85	0.19	0.004	0.009	0.083

[a] Approximate volume of each constituent estimated microscopically.
[b] Carbon Equivalent = T.C. plus 0.3 (Si + P)

TABLE III

RESULTS OF THERMAL TREATMENTS

Heat No.	Test Bar Type	Ultimate Tensile Strength, 1000 psi	Yield Strength, 1000 psi	Elong., Pct	Thermal Treatment
28	A47-48[a]	72.3	60.0	9.8	1 hr at 1330°F air cooled
81	Keel Block	68.2	52.6	13.5	1 hr at 1330°F air cooled
82	Keel Block[c]	72.8	56.5	20.0	2 hr at 1675°F, 3 hr at 1330°F, furnace cooled
83	4 x 4 x 24 in.[c]	77.2	59.0	12.3	2 hr at 1675°F, 3 hr at 1330°F, furnace cooled

Chemical Composition, Pct

Heat No.	T.C.	C.E.[b]	Si	Mn	S	P	Mg	Nodulizing Agent
28	3.29	4.35	3.49	0.32	0.016	0.04	0.041	70-30 Cu-Mg Alloy
81	4.00	4.80	2.64	0.30	0.005	0.15	0.064	70-30 Cu-Mg Alloy
82	3.71	4.58	2.86	0.30	0.008	0.15	0.060	70-30 Cu-Mg Alloy
83	3.64	4.52	2.85	0.50	0.007	0.08	0.070	70-30 Cu-Mg Alloy

[a] ASTM A47-48 as-cast tensile bar 0.625 in. diam.
[b] Carbon Equivalent = T.C. plus 0.3 (Si + P).
[c] 0.625 in. diam. test bar machined from cast specimens.

substantially lower elongation than the heavier keel block specimens. This is due to the naturally higher cooling rate, which retards graphitization of the combined carbon in the lighter sections.

In extremely thin sections (¼ in. and under) the cooling rate is often sufficiently rapid to suppress graphitization to the extent that free cementite will occur in the microstructure. This condition is illustrated in Table II and Fig. 3 showing the relationship between microstructure and section thickness. In the heat cited (which is a typical analysis) significant quantities of free cementite were noted in all sections less than ½ in. A gradual increase in the proportion of ferrite was observed as the section thickness increased above ½ in. The correlation between these microstructural changes and Brinell hardness is close, and it is to be expected that corresponding changes in strength and elongation would follow the same pattern.

Mg Raises Section Sensitivity

Table III summarizes the results of single- and double-stage annealing of a number of nodular iron specimens. In easily graphitizable specimens such as heats 28 and 81 a simple subcritical anneal was found sufficient to produce marked improvement in ductility with only moderate reduction in strength. It should be emphasized that the keel block specimen responds more favorably to annealing than does the cast 0.625-in. diam specimen.

Heat Nos. 82 and 83 are listed to illustrate the effects of double-stage annealing on heavier sections. The slightly higher strength and lower elongation of heat No. 83 as compared to No. 82 are largely attributable to the difference in manganese contents. Increasing manganese contents have the effect of increasing section sensitivity, and retarding graphitization during annealing with resultant lower ductility.

The tensile data on these specimens are indicative of the possible application of nodular cast iron to extend the scope of the malleable industries facilities to include products of heavier section. Properties of nodular iron in 3- to 4-in. sections comparing favorably with those of malleable would be of considerable interest to the malleable industry.

Malleable-Type Bar Suggested

In view of these investigations, the following recommendations are made: For sections ¾ in. and under, the standard ASTM 0.625-in. diam malleable test bar is suggested; due to decreased section sensitivity in the range above ¾ in. and up to 2 in., the keel block may be used; for all castings having section thicknesses 2 in. or over, a heavy section specimen having a cross-sectional area approximately equivalent to the average cross sectional area of the casting, should be poured or a suitable coupon attached to the casting. Standard tensile specimens should be machined from this specimen.

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[3] *J. T. MacKenzie, "Ten Years of Advances in Ferrous Foundries," Metal Progress, Oct. 1950, p. 499.*
[4] *American Society for Testing Materials, "1946 Book of ASTM Standards," Part I Metals Spec. No. A-27-46, p. 871.*
[5] *J. H. Lansing, "Malleable Iron Castings," section in "Kent's Mechanical Engineers' Handbook," 12th edition, John Wiley & Sons, New York (1950), p. 19.*
[6] *G. Vennerholm and H. Bogart, "Nodular Gray Iron Compared With Other Ferrous Materials," Materials and Methods, Apr. 1950, p. 51.*

POURING a flask of stress rupture specimens for studying heat-resistant cast alloys.

How to set up a PRECISION CASTING FOUNDRY

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The Materials Laboratory Engineering Div., Air Materiel Command, Wright-Patterson Air Force Base, Dayton, has set up a small precision casting foundry. Its purpose is to aid in the heat-resistant cast alloy development program being conducted by that laboratory. Techniques and procedure had to be developed, some of which are new and believed to be an improvement over those being used elsewhere.

The first and most important step in precision casting is that of making a suitable die for wax injection. Replicas from the die can be no better as to surface and dimensions than the die itself. The work was concentrated on soft metal dies because of their low cost and simplicity of manufacture.

In making a soft metal die for forming wax patterns, a parting line must first be established. This can be done in one of several ways. A channel can be cut in a smooth piece of solid plaster to the desired depth of the parting and the master pattern placed in this channel, and modeling clay can be used to fill in until all the surface is level. An easier and more accurate method for establishing a simple straight line parting is to use a template and a surface plate.

While numerous articles have been published on precision investment casting, very little has been written specifically to aid the beginner. A small precision casting foundry was installed as part of a development program on heat-resistant cast alloys. Some new techniques, as well as standard procedures, were adopted.

The template is a piece of sheet metal as thick as the parting line depth with a hole machined in it of approximately the same size and shape as the master pattern. The template is placed on the surface plate with the master pattern in the hole. Modeling clay is used to fill in around the edges of the master pattern, making the surface level. The thickness of the material from which the template is made should ideally be that of the parting depth; however, it can be thinner and blocked up with small strips to the correct height, as in Fig. 1.

A flask is placed on the parting device around the specimen and plaster mixed to a creamy consistency is poured into the flask. The plaster is allowed to harden, then the parting device and the plaster half are placed in an oven at 200°F for 2 hr to drive out any uncombined water. The parting device is then separated from the plaster flask. Care should be taken to insure that the position of the master pattern in the flask is not disturbed.

After the plaster flask has cooled it will probably be necessary to do some touching up of the plaster half around the pattern. It should be kept in mind that the surface exposed will be a a die surface and should be touched up accordingly. A thin layer of carbon is applied to the master pattern, either by painting with graphite suspended in alcohol, or smoking with an oxygen-lean acetylene flame.

Flame Gives Smoother Coat

For extremely smooth surfaces the acetylene flame method is desirable, because a much thinner and smoother coat is obtainable. The purpose of the carbon or graphite coating on the master pattern is to control the rate of cooling when the molten metal is poured and prevent cold shuts on the die surface.

The plaster half is placed in position on the diemaking machine and another flask is placed on top of it, as in Fig. 1. A sufficient amount of metal to fill the flask is melted in the pot. The metal temperature should be approximately 10°F above the melting point for sufficient fluidity to fill threads and other small details.

When the metal has reached the correct pouring temperature, the pot is swung into position over the flask. A plate with a hole of the same diameter as the pouring chamber is placed on the flask to act as a seal. The pressure plate is put on top of the chamber and screwed in place, after which the metal is poured. The metal should literally be dumped, and the air pressure applied an instant later. As much air pressure as possible is used with 50 lb as the absolute minimum. The air pressure should be left on until most of the metal has solidified; 2 min is correct for a flask 3 x 4 x 1 in.

After the flask has cooled it is separated from the plaster portion. The master pattern will remain in the metal half. There will be some surface irregularities on the metal half, because metal will have forced its way around the master pattern and into holes in the plaster. These defects can easily be removed with a pocket knife, small file, and a piece of No. 1 emery polishing paper. When the metal die half is ready to have the other half cast against it, the soft metal portion is painted with graphite suspended in alcohol and the master pattern is again smoked with an oxygen-lean acetylene flame.

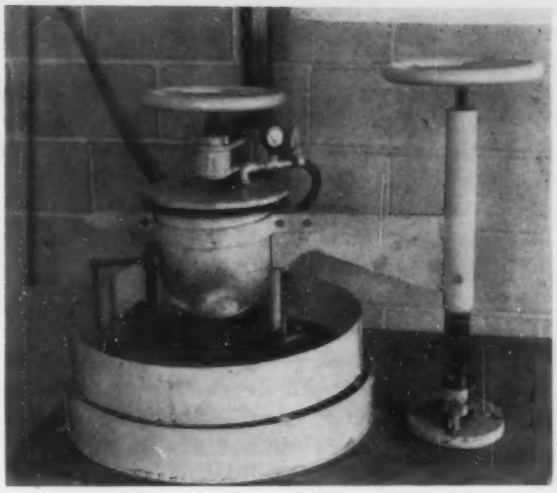


FIG. 1—Diemaking machine used to form the soft metal dies that mold the wax patterns.

A graphite suspension is painted on the soft metal portion because it is easier to obtain a heavy coat with it. The heavy graphite coat will prevent fusion of the two halves. As in the case of smoking the master pattern in the plaster half, it is necessary to control the cooling rate of the metal to produce a flawless surface. When the second half is cast the master pattern must again be smoked.

Water Cools Die Machine

The first half is placed in position in a container on the diemaking machine. Water is added until the water level is almost the height of the flask. Water will cool the first half when the hot metal for the second half is poured, thus helping to prevent fusing of the two halves. The temperature of the metal for the second half is heated to about 5°F above its melting point.

The chamber containing the metal is swung into position over the first half, a flask is placed on top of the metal half, and the cover plate is put in position. The pressure plate is put on top of the chamber and screwed into place. The metal is now poured and air pressure applied in the same manner as for the first half. When the flasks have cooled they are removed from the die machine and separated.

The master pattern is removed and the two

die halves are inspected. If the die is satisfactory, the next step is gating the die for wax injection. The gate in the die should be the same diameter as that of the wax gun orifice, and the wax should be injected straight into the die. There should be no turns in the die around which the wax has to flow, and no sudden changes in cross-sectional area. Resistance should be kept to an absolute minimum.

The method used for permanent alignment of the die halves will depend greatly on the injection equipment used. It was found that the only satisfactory method was to place steel pins through the flask, which is also made of steel. "Dimples" and steel pins through the soft metal die are both commonly used methods. However it was found that neither worked satisfactorily for more than a few injections.

Three soft metal alloys were used for making dies: Cerrosafe, with 40 pct Bi, 40 pct Pb, 11.5 pct Sn and 8.5 pct Cd; Lipowitz alloy, containing 50 pct Bi, 26.7 pct Pb, 13.3 pct Sn, and 10 pct Cd; and Dee alloy, with 33.2 pct Pb, 18.8 pct Sn, 47.7 pct Bi, and 30 pct Sb. Cerrosafe and Lipowitz alloys were not satisfactory because of their creep at room temperature. The cavity made by the master pattern changed dimensions considerably overnight. On the die half of a 0.250-in. stress rupture specimen, the cavity dimension shrank 0.01 in.

Dimensions Must Be Checked

It was possible to use a die made of these alloys by placing the master pattern in the cavity and putting a pressure of 3000 psi on the die for 30 min before using it. Also, the dimensions must be checked on every pattern. The Dee alloy proved superior to the other two materials, both in surface produced and in dimensional stability. The creep rate is much lower, but Dee alloy dies must also be reworked occasionally.

The machine used for wax injection consists of a wax gun electrically heated, mounted on a pneumatic ram with a hydraulic vise for holding the die in position. Kerr precision pattern wax (dark green) is placed in the gun and heated to the mushy state, approx 135°F. The pneumatic ram is actuated by 100 lb air pressure, forcing the wax into the die. The wax gun moves forward about ⅛ in., assuring that the nozzle will be forced tightly against the die.

The wax gun nozzle has the same taper as that of the nozzle hole in the die, making a close, tight-fitting joint and preventing wax leakage. The hydraulic vise is operated at pressures between 8000 and 10,000 psi to force the die halves tightly against each other and prevent flash. The high pressure on the vise also prevents the two halves from parting when the gun nozzle moves forward on injection. Wax is injected in the mushy rather than the liquid state, because waxes have more shrinkage as the casting temperature increases.

Kerr Microfilm is used as a die lubricant. One application to the die surface will assure about five easy pattern releases. Care must be taken that the release lubricant is not applied too liberally. An excess on the die will cause poor surfaces on the pattern.

The pattern should be removed from the die before it cools and becomes brittle, else breaking may occur.

During warm weather, blisters have been seen forming on a considerable number of wax patterns. It was found that if the pattern is removed from the die immediately after injection and placed in a container of cool water, these blisters do not form. The blisters are probably due to entrapped air forcing its way out through the incompletely solid wax. Cool water quickly solidifies the wax surface, thus offering more resistance to the air bubble.

Uniform Cooling Essential

The arrangement in which the patterns are assembled depends on the part and metal from which it will be cast. The one principle for obtaining uniform physical properties in every casting is that all pieces should be arranged in the flask in such a manner as to have the same cooling rate. Equal cooling rates can be obtained by assembling the parts so they are the same distance from the outside of the flask, as in Fig. 2.

There should be as little cross-sectional area change as possible, and the metal should flow up into the part being cast. Shrinkage will usually occur at a point of section change. Stress rupture test bars were cast satisfactorily

FIG. 2—Pattern assembly for stress rupture specimens, designed so that all parts are an equal distance from the outside of the flask to insure uniform cooling rates.

Typical Silica-Alumina Precoat Mix

For a total volume of 530 cc:

164 cc sodium silicate.
33.3 pct by weight meta sodium silicate.
392.5 g silica flour.
98.5 g No. 40 mesh SiO_2.

Mix together slowly, adding the solids to the liquid while stirring. Then mix together the following and add slowly to the liquid while stirring.

235.5 cc polyvinyl alcohol solution (2 pct polyvinyl alcohol by weight).
236 g Al_2O_3 (extra fine).
59 g No. 40 mesh SiO_2.

with direct down-pouring, even though this is a violation of the principle that the metal should flow up. The specimens were satisfactory for test purposes only because the shrinkage and inclusions were concentrated in the lower threaded portion and did not extend into the gage length.

The assembly is made by welding the patterns to a central sprue. A cavity with a pouring sprue and shrink rod through which the metal flows to the bottom of the cavity is provided. Leads are run out from this shrink rod to the patterns, and the metal flows up to fill the cavity. By assembling in this manner the shrinkage occurs in the leads and shrink bar, leaving the test bars completely sound. After the patterns have been assembled, the unit is fastened to a steel plate coated with wax by soldering the pouring sprue to the wax coating.

Clean Pattern Before Coating

Patterns must be cleaned before they are coated. Either alcohol or acetone may be used. Acetone is more efficient in removing grease and dirt and does not leave a film on the patterns as does alcohol. The alcohol film is not detrimental to the coating operation, but it does prevent a close visual inspection to determine cleanliness of the pattern assembly. The pattern assembly is dipped in the cleaning solvent and then air-dried. Drying time will depend on the shape of the pattern; a pattern with threads takes longer to dry than one with a flat surface. The pattern must be absolutely dry before it can be coated.

Ransom & Randolph No. 181 compound was used for coating, mixed as follows: 50 cc of coating material liquid No. 181A, and 50 cc of coating material liquid No. 181B; the two liquids are mixed and 250 g of coating material powder No. 181 are added and thoroughly mixed. Using these proportions, the coating will be the correct consistency for dipping.

A small camel's hair brush is best for applying the coating material to the threaded portion of stress rupture specimens. This assures filling the threads to the root. After the threaded portion is painted with coating, the specimen is dipped in the coating solution. Immediately on withdrawal from the solution, placing sand is applied as in Fig. 3. This is a coarse silica which helps prevent the coating from running.

After the coating air-dries for 12 hr, it is coated with Tygon waterproofer, made by mixing equal volumes of Tygon paint and thinner. The specimen is then allowed to air-dry for 8 hr.

Properties of the coating are improved by the addition of 20 pct coarse silica (40 mesh). The large particles act as buffers, enabling the coating to withstand more thermal and physical shock without cracking. Most castings made from alloys containing more than 20 pct Cr have a heavy coat of chrome oxide on the surface in the as-cast condition. This must be removed by vapor blast or other methods.

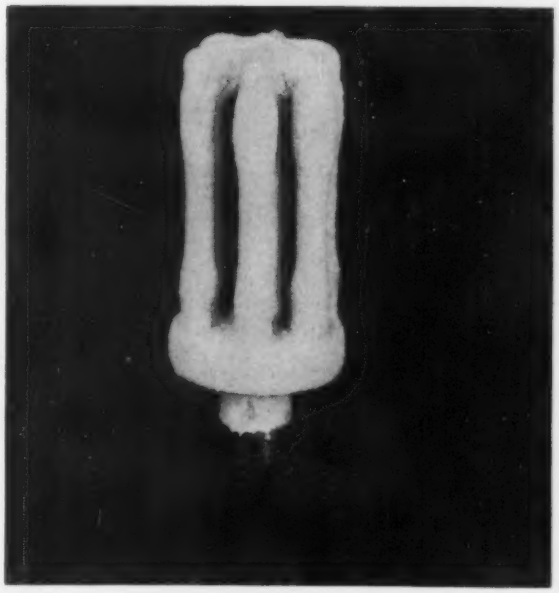
New Precoat Lowers Costs

Experiments with various refractory oxides showed that a combination of aluminum oxide with silica inhibited the formation of chrome oxide on castings. The use of aluminum oxide in the precoat between the ranges of 10 to 50 pct produces castings that break out of the mold without adhering refractory material or oxide on the surface. The casting is smooth and free of the usual chromium oxide obtained with a silica flour precoat. This new alumina-silica precoat eliminates cleaning operations, thereby reducing cost of the castings.

Investigation has shown that the best surface is produced by a coating with the following composition: 50 pct silica flour, 30 pct Al_2O_3 and 20 pct SiO_2 (40 mesh). The method of mixing is unique and must be followed for good results.

The silica flour is mixed with 20 pct of the

FIG. 3—Pattern assembly after precoating, with the coarse silica placing sand already applied.



total coarse mesh SiO_2. The aluminum oxide is also mixed with 20 pct No. 40 mesh SiO_2. The silica flour mixture is mixed thoroughly with sodium silicate, and the aluminum oxide is mixed with 2 pct polyvinyl alcohol solution. Then the two slurrys are mixed together and the patterns are dipped in the same manner as for the Ransom & Randolph coating. An example of correct mixing is shown in the box on p. 93 (upper left).

If both slurrys are allowed to stand for ½ hr, it is not necessary to vacuum to remove the air bubble. The silica slurry should be added to the aluminum mixture and then stirred until the resulting slurry is uniform. As the slurry is stirred it will become thicker, approaching a gel. If the gel becomes too thick, water can be added.

Some more information useful in preparing a silica-alumina precoat is the ratio of liquid to solids which should be maintained.

1 cc polyvinyl alcohol 2 pct solution to 1.24 g (Al_2O_3 + 20 pct SiO_2).

1 cc sodium silicate to 3.5 g (silica flour + 20 pct SiO_2).

Before investing, the flask must be fastened to the plate on which the coated pattern assembly is mounted. The flask edge is dipped in liquid wax so a small deposit is built up. This edge is then easily soldered to the wax-coated plate with a hot steel rod or electrically-heated soldering tool.

Ransom & Randolph I. C. 711 G-1 investment material is used. The investment slurry is added slowly in the ratio 20 parts of water to 100 parts of investment material by weight. When the investment material is thoroughly mixed, it is poured into the flask. Allow the investment material to set up for approx 24 hr before wax melt-out. If the investment has not completely set up when placed in the oven the investment material will crack and flake.

After the investment is completely set up, the flask is placed in a heated oven. The oven should be at 180°F before the flask is charged because the wax has a greater thermal conductivity than the investment. By melting out in this manner few stresses will be created on the coating, minimizing the likelihood of cracking. The flask should be left in the oven for 8 hr or longer.

Resistance Furnace Heats Molds

After removal from the melt-out oven the molds are placed in a resistance furnace, where they are slowly raised to the mold casting temperature. The temperature is raised 100° to 150°F per hr until it reaches 1200°F. Above 1200°F the furnace is heated as fast as possible. The critical temperature range in which the mold is likely to be cracked is below 1200°F, because the coefficient of thermal expansion for silica is high. A phase change takes place at about 1100°F; above this point, the coefficient of expansion is greatly decreased.

A 30-kw Lapel converter and a 3-lb crucible are used for melting. The metal is cast by gravity methods only. Since the purpose of the project is the development of alloys for high-temperature service, all melting and casting were confined to this type alloy. The work started with the melting of scrap Vitallium turbine blades, and has proceeded to the point of making new alloys from virgin materials.

Foundry sand buckets of magnesium empty completely

Sand delivery equipment operates at full capacity in those foundries using buckets made of magnesium. These new conveyer containers do a dependable job of dumping at the top of the sand elevator and coming down empty, ready to pick up another load.

Good results are obtained whether dry or green sand is handled. Experience to date indicates that the buckets give service equal to or better than previously used materials. And when these new components do wear out their considerably lighter weight makes replacement an easier job, since the belt that carries them up and down the elevator can be of markedly lighter construction.

This lighter weight also takes less power to move and reduces machine wear. However, foundries find that their biggest advantage is their ability to dump their loads of sand completely.

By Herbert Chase

Consultant, Forest Hills, N. Y.

Homemade devices

GIVE CORE WORK ECONOMIES

Simple, homemade definning machines using low-cost rubber dies result in a labor saving of 45 pct on one line at Buick. New conveyers and handling methods also cut labor costs and eliminate much of the breakage. Faster core blowing and automatic dipping speed production.

Many cost cutting expedients have been developed and introduced at the gray iron foundry of Buick Motor Div., General Motors Corp., Flint, Mich. These economies have helped Buick to attain one of the lowest costs per ton of casting produced within the highly mechanized foundries of the corporation and have contributed to improved quality. They have also aided greatly in boosting output to keep pace with overall Buick production at peaks never before realized.

One of the major economies in core making has been the development of simple homemade machines for removing fins from cores. Formerly such work was done by hand with files or similar tools by about 24 workers. On one line handling many types of small cores, nearly all definning work is now done by three or four girls who operate the low-cost machines.

The top of one such machine, operated by a treadle, is shown in Fig. 1. All the operator does is to take a predried core from the belt conveyer at her right, lay it on a base or support similar to a dryer that the core fits, press the treadle to lower a frame-like "die" that fits the contour of the core, remove the definned core and put it back on the conveyer.

The die that does the definning is merely a flat mat of rubber molded to an interior contour fitting that of the core at the plane where the fins occur. This rubber is held between two frames that are fastened together by screws and clear the core by about ¼ in. The overhanging rubber wipes across the core at its parting and, in so doing, removes the fins far more rapidly and with greater uniformity than hand tools do.

In these simple machines, the die frame is supported by two rods that slide through guide bushings in the top plate of the machine and are moved by the treadle. The rubber in the die is yielding enough to avoid breaking the core and sufficiently wear resistant to last from 3 weeks to 2 months of daily use. Some rubbers have definned 6000 cores a day for 50 days before discarded.

Larger Machines Air-Operated

As wear occurs, the screws that clamp the rubber mat between supporting frames are tightened and the compression on the rubber makes the inner contour contract. This is repeated as required until the rubber is worn out. Rubber used is about ¼ in. thick. Pressure needed to defin most cores up to a foot square or equivalent is small and requires too little pedal pressure to be tiring. The die frame has clearance under the core and any chance of pinching fingers is slight.

For larger cores, such as those for an 8-cylinder engine manifold, some air-operated machines are used. Loading is done in the same way by hand, but the die is operated by a small

FIG. 1—Treadle-operated machine has a rubber die between the flat steel plates, which wipes fins off the core in a fast operation.

FIG. 2—The machines shown above have flexible metal plungers that remove fins from the eight large holes in the body cores.

FIG. 3—Setup for green dipping of body cores by lowering them, on the perforated table, into the dip tank.

air cylinder and four guide rods are used. To insure safety, a guard is used and two air valves are placed in series. One hand must be used on each valve, hence neither hand can be under the die. Use of this method of definning reduces labor about 40 pct, quickly paying for the simple machines employed.

Dies for molding the rubber definning mats cost $100 to $150 each and can be used indefinitely. The molded mats have screw holes cored to match those on the frame. Molds used for this definning are produced by Corduroy Rubber Co., Grand Rapids, Mich., which also supplies the mats.

Not all cores can be definned completely if at all by these methods, and some partly definned by these means may still require some hand definning. However, the total savings realized are large and the method is well adapted to a broad range of cores. In the case of large 1-piece cores, such as those forming the water space in cylinder blocks, mechanized definning is more of a problem and was not solved until the machines shown in Fig. 2 were devised.

Removes Eight Fins at Once

In this case, the fins occur at the end of each large hole and at core print bosses along one side of the core. Hole fin removal was formerly done by hand, giving the tool a rotary motion. This is now done by pushing eight plungers, one into each hole. Each plunger is somewhat bowl-shaped and of hardened steel turned to a thin section, and has diagonal slots at intervals around the bowl. These make the plungers flexible; the sections yield so as to conform to the holes without breaking the core, yet apply enough radial and axial pressure when inserted to wipe off the fins in all eight holes at once.

The shanks supporting the plungers at the center have a loose fit, permitting enough float for the plungers to conform even when the core varies up to ¼ in. total length. Such variations may occur with changes in temperature and other conditions. All the plungers are on a common head in a vertical plane with plunger and guide pin axes horizontal. The same head has top extensions carrying blocks faced with emery cloth. These wipe across top bosses and remove fins thereon.

One Man Does Work of Four

To use this machine, the core is set in a fixture on the base with end bosses fitting into notches. A hand lever is then advanced to move the head horizontally forward and back. These two strokes clear off the fins. With the machines, one man does the work formerly done by four.

Nearly all cores made in this plant are blown in Osborn machines. Core boxes are assembled on circular tables next to the machine and one to four men work at these tables. One of these

men slides each completed box into the machine and moves the controls.

Standard machines require moving a lever that brings the head into place, pressing a pedal for sand to be blown in, operating a lever for moving the box back to unloading position and pressing a safety lever to insure that hands are away from the box. At Buick's request, these controls have been simplified and combined so that the full cycle is controlled by a single lever with the operator in such position that hands are safe.

All events in the cycle take place automatically, reducing the cycle time about 25 pct. This also saves about 5 pct of the total time of the man who does some work of preparing boxes and moving them into and from the machine.

Cores Are Dipped Mechanically

Many green cores were formerly dipped or sprayed by hand. All larger cores are now dipped mechanically. One means is to place them on a grating which is lowered into a tank, as in Fig. 3. It is also done by elevating a tank so that the core, advancing on a conveyer while supported on a carrier having a grating base, is dipped in the elevated tank.

Where the tank is elevated, it is controlled automatically, and is raised and instantly lowered as soon as the carrier on an overhead chain reaches a definite position. Excess from the dip is then blown off by a man who also unloads the conveyer and places the cores on a spotting bench. After spotting, the spotters shift the cores to another conveyer that feeds a core assembly line. Labor savings amounting to the time of 1½ men result.

Four so-called body cores, each of which produces two cylinder holes in the block casting and a space below the hole in the crankcase, are required for each such casting. These cores are baked in three ovens, are unloaded from carriers by hand and are set on roller conveyers, one serving each oven. These conveyers parallel the inspection conveyer in the foreground of Fig. 4 and are at right angles to the transverse belt conveyer shown in the background, which the roller conveyers feed.

FIG. 4—Baked body cores on the transverse belt conveyer, left center, are automatically discharged onto the inspection belt, foreground, without damage.

This transverse belt ends at the inspection conveyer and the cores must be transferred to the latter. With the arrangement shown, this transfer is accomplished automatically.

The transverse belt is slightly higher than the inspection belt and passes over a pulley set to just clear the latter. This causes the front edge of the advancing cores to overlap the lower belt and the transfer is effected without upsetting or injuring the cores. A horizontal rubber idler wheel just above the junction acts as a guide and deflects any core that strikes it during the transfer.

With this simple conveyer arrangement, the time of at least four men is saved. Formerly, there was a crew of men on each roller conveyer performing inspection and cleaning of fins and vent holes. Now, there is one man at each roller conveyer who only shifts cores from oven racks to conveyers. Inspection and cleaning of cores from all three ovens is done by three men on the inspection belt; one of these men transfers cores in sets of four to tote racks for delivery to the molding conveyer line.

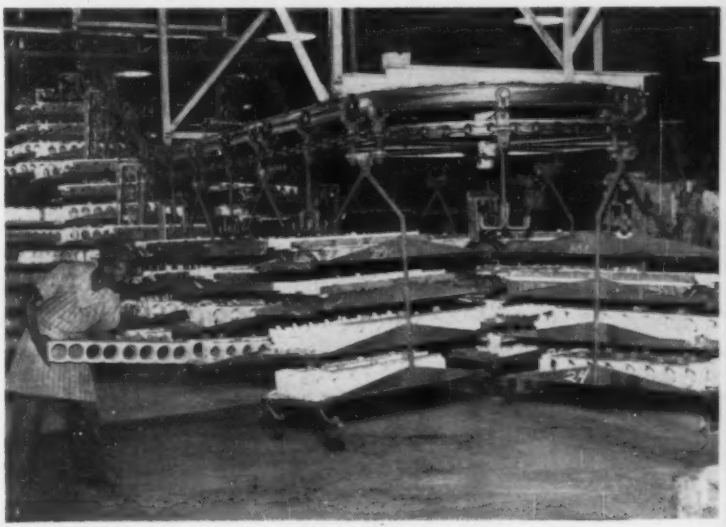


FIG. 5—Loading cores and core assemblies onto the chain conveyer carriers that transfer them to the molding lines.

Many cores have to be built into assemblies, some quite complex. Such work is done on or close to conveyer belts with components taken from tote racks spotted back of the operators. At the end of the belt, the complete assemblies are transferred by hand to chain conveyer racks like those shown in Fig. 5. The same racks also carry cores that need no assembly to the molding

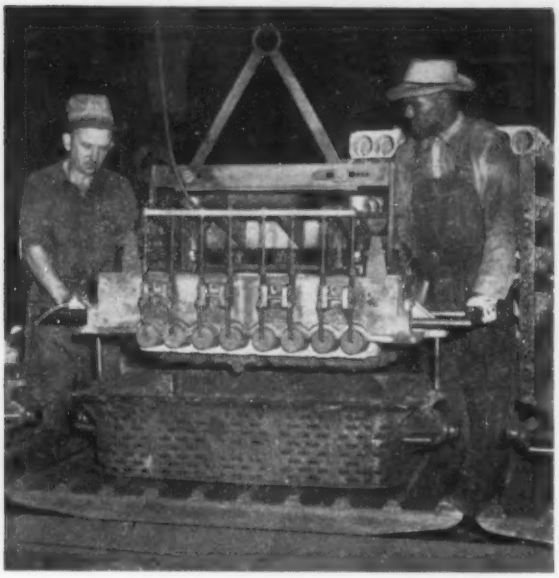


FIG. 6—This lifter device is used to transfer a cylinder block core assembly to a drag mold. Breakage is minimized and correct location of the core in the mold is assured.

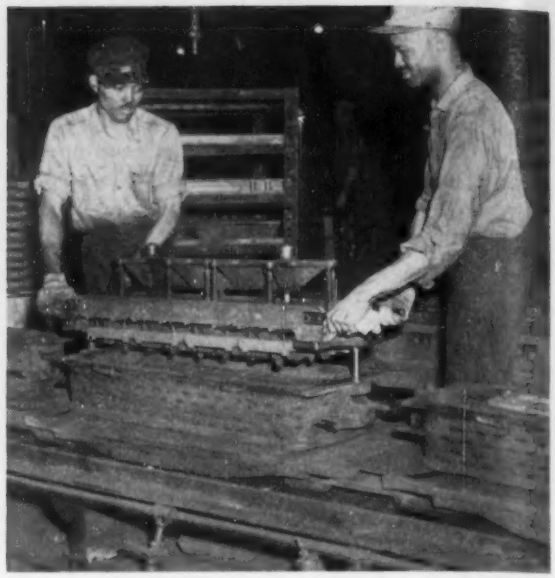


FIG. 7—With this lifter, cylinder head core assemblies are transferred from chain conveyer racks to a drag mold. The lifter is released instantly when the core assembly is set.

Homemade devices (continued)

lines. Assemblies often require special trays or supports that are returned to the core room on the chain conveyer racks after the cores are removed and placed in molds.

Formerly, no chain conveyer was used and all cores went to the foundry on racks handled by tote trucks. Some are still so handled, but plans for their elimination in such work are in process. Use of the present chain saves the time of seven men, including three truck drivers. In addition, core breakage is greatly reduced and there is no waiting for trucks. The same men who load the chain carriers unload returned trays and put them on roller conveyers to core assembly points for reuse.

Trays for complex core assemblies are so made that, when the cores reach the molding line, they are easily picked up and transferred to molds without injury. One lifting device, used to transfer a core assembly to a cylinder block drag mold, is shown in Fig. 6. This device not only effects handling without breakage, but guide pins at the ends insure correct placement in the mold. When the core is in place, movement of a hand lever disengages supporting hooks from vent holes and the lifter is raised free and is ready to handle the next core.

A simpler lifting device for a lighter core used in cylinder head molds appears in Fig. 7. No sling is needed, as two core setters easily transfer a core assembly from a chain conveyer rack to the mold. Such devices facilitate handling and reduce the chance of core breakage. They also expedite the setting job.

NEW BOOKS

Galvanizing (Hot-Dip), by H. Bablik. This third edition of Dr. Bablik's standard work on galvanizing is completely rewritten and incorporates all the results of recent scientific research and practical experience. It is devoted entirely to hot-dip galvanizing, and those parts dealing with the theory of pickling, especially the iron-zinc reaction and fusion-reaction, have been developed and extended. The book will appeal especially to the technical executives of metalworking plants, and to those of galvanizing works in particular. E. & F. N. Spon, Ltd., 22 Henrietta St., London W. C. 2, England. 70 S. net. 502 p.

Introduction to Mechanical Design, by T. B. Jefferson and W. J. Brooking, approaches the subject as a whole in the light of functional purposes of a machine, its configuration requirements, economic considerations, the use of rational and empirical design data, and desired final appearance, endeavoring to place all these in proper perspective as they are weighed by the experienced designer. A number of design considerations are discussed which are not extensively or even commonly treated in most machine design texts. Ronald Press Co., 15 E. 26th St., New York 10. $6.50. 612 p.

Open-End CMP on Basic Metals Set for July 1

Third quarter will be shakedown period, but may be a painful one . . . Defense to get their share first . . . What's left is for civilians . . . CMP to have seven initial orders.

Washington—The runaway DO system will be replaced by a Controlled Materials Plan for steel, copper, aluminum on July 1. It will be an open-end CMP, taking what it needs for defense and its supporting programs. The plan evolved from the idea that a nation only partially at war need not turn all its production to a total war basis.

If total war comes, the open-end can be sealed up. Framework, experience, and system will already have been established. NPA expects that the third quarter will be little more than a shakedown period with substantial results coming in the last quarter. Others believe that the third quarter will be the most painful for non-defense industry.

What's Left-Over—After CMP has given the military, defense-related and essential civilian programs what they need for operation, left-over supplies will be in the open market for civilian uses. But NPA will try to create some order in the competition by continuing issuance of limitation orders.

Seven initial orders will be issued: CMP-1, operating rules and procedure; CMP-2, inventories;

Turn to Page 114

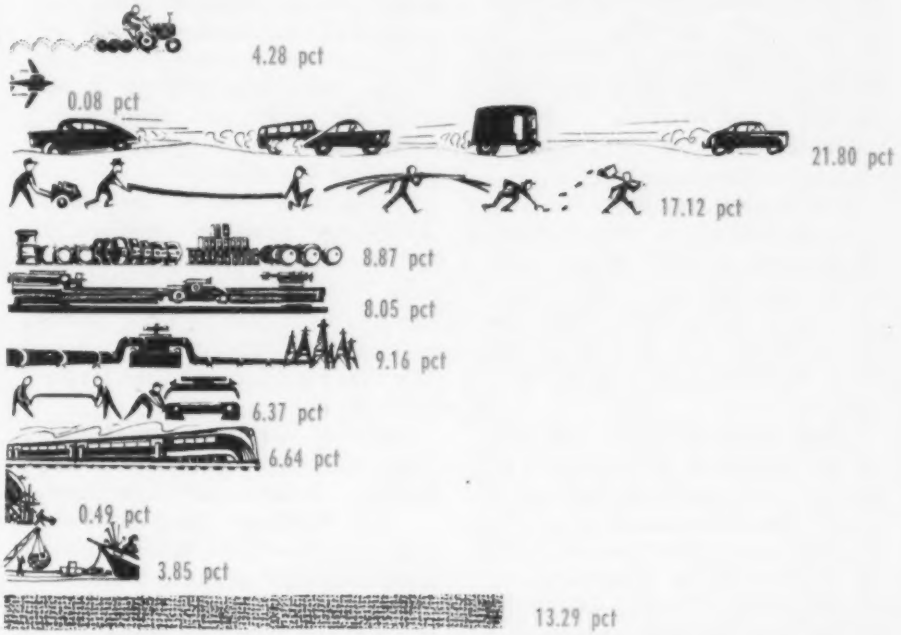
Who Got the Steel in 1950?

New York—Last year's record steel production is reflected in higher steel consumption by steel users. A compilation of steel distribution data by THE IRON AGE shows that all major groups of steel users, except shipbuilding and export, received more steel in 1950 than they did in 1949.

Total finished steel shipments were 72,233,000 net tons in 1950, an increase of 24.3 pct over 1949's total of 58,104,000 net tons.

Real Users—THE IRON AGE compilation is based on American Iron & Steel Institute data on Shipments of Steel Products by Market Classifications (AIS-16).

The AISI data lists steel shipments by products to 21 groups of



*In thousands of net tons

STEEL DISTRIBUTION BY CONSUMING INDUSTRIES

IN THOUSANDS OF NET TONS

	1939		Yearly Average 1941-44 Incl.		1945		1946		1947		1948		1949*		1950*	
	Tons	Pct	Tons	Pct	TOns	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct
Agriculture	1,421	3.6	1,565	2.4	2,426	4.3	2,100	4.3	2,422	3.84	2,743	4.16	2,644	4.55	3,094	4.28
Aircraft	.....	....	5,557	8.8	5,521	9.7	32	.06	44	0.07	39	0.06	44	.08	56	.08
Automotive	5,906	15.1					7,379	15.1	10,292	16.32	11,330	17.17	11,880	20.45	15,746	21.80
Construction, Maintenance	8,100	15.6	8,379	13.3	8,353	14.7	8,130	16.7	10,039	15.92	10,157	15.40	10,020	17.25	12,363	17.12
Containers	2,978	7.6	4,216	6.7	4,333	7.6	4,749	9.7	5,598	8.87	5,844	8.85	5,026	8.65	6,409	8.87
Machinery, Tools	1,460	3.7	3,191	5.1	4,739	8.3	4,438	9.1	5,646	8.96	5,337	8.09	4,274	7.36	5,612	8.06
Oil, Gas, Water, Mining	1,842	4.7	2,221	3.5	2,670	4.7	2,480	5.1	3,833	6.08	5,080	7.70	5,455	9.39	6,619	9.16
Pressing, Forming, Stamping	1,842	4.7	2,809	4.5	3,800	6.7	3,127	6.4	3,770	5.98	4,256	6.45	3,124	5.38	4,601	6.37
Railroads	3,250	8.3	5,422	8.66	5,298	9.3	4,764	9.8	5,999	9.51	5,866	8.89	4,038	6,95	4,790	6.64
Shipbuilding	518	1.3	9,657	15.3	3,374	5.9	320	.64	373	.59	716	1.09	722	1.24	355	.49
Exports	2,817	7.2	7,701	12.2	3,793	6.7	3,378	6.9	4,639	7.36	3,576	5.42	3,796	6.54	2,783	3.85
All Others	10,933	28.2	12,212	19.4	12,669	22.2	7,879	16.2	10,402	16.50	11,029	16.72	7,077	12.18	9,560	13.29
Total	39,067	100.0	63,493	99.8	56,946	100.0	48,776	100.00	63,057	100.00	65,973	100.00	58,104	100.00	72,233	100.00

* Revised.

Data by American Iron & Steel Institute; Compilation, THE IRON AGE

consumers. THE IRON AGE compilation combines the steel consumers into 12 groups. But, more important, it assigns steel shipments to warehouses and jobbers to the consuming groups who actually received it for fabrication into products. The amount of warehouse-jobber steel assigned to actual users amounts to almost one-fifth of total finished steel shipments, 13.3 million tons or 19 pct.

Autos Top All—Exceeding its 1949 steel consumption by 3,866,000 net tons, the auto industry was again the biggest user of steel in 1950. This industry consumed 15,746,000 net tons of steel or 21.8 pct of all steel used. But growing defense and essential civilian needs indicate this and other industries will get less steel for peacetime use in 1951.

The construction industry, including maintenance, received 2,343,000 net tons more steel in 1950 than it did in 1949, holding its place as second largest among consuming groups. Total steel shipments for construction and maintenance of 12,363,000 net tons were 17.12 pct of all steel shipped.

Change to Guns—The new controlled materials plan to provide steel for defense and essential civilian users is bound to cause big changes in the pattern of steel distribution. But it should be remembered that these consuming groups are not total defense and essential civilian goods producers; and they are not total producers of non-essentials.

Some of these groups will probably have enough contracts for tanks, planes, and other military equipment, to use up about as much steel as they are denied for their regular production of peacetime goods. Thus the same users may tend to get the steel—but for different purposes.

Procurement Clinic to Give Subcontracting Shot in Arm

Boston—A procurement clinic to give a shot in the arm to defense production subcontracting among smaller firms in New England and the Northeast will be held at the Commonwealth Avenue Armory here from May 15 to 18. Over 100 prime and major subcontractors will display many parts and equipment.

The military put the emphasis on smaller firms by specifically inviting all potential subcontractors, "particularly those employing less than 500 persons." Production facilities and capacities may then be discussed with larger contractors.

Sponsors are the armed services, the New England Council, Boston Chamber of Commerce, Smaller Business Assn. of New England, Associated Industries of Massachusetts, and the state development commissions of New England and New York State.

German Steel Wins Capacity Advantages with Official Approval

Dusseldorf—German steel men, now grown valuable to plans for European rearmament, are shedding the bonds of Allied restriction. The Mannesmannroehren Steel Co., at Dortmund, has won official agreement to a steelmaking capacity of more than 2 million annual tons—about double the figure that used to be noised around as the limit for a peaceful Ruhr.

Former German steelmaking firms will be organized once more. After the assets of its former group have been disentangled, a Thyssen Co. will again be formed. Vereiningte Stahl and Krupp are materializing and even the war-smashed Reichswerke, in the Sulzgitter, will reappear later.

Expected now are 28 reincarnations of Ruhr steelmakers—formed by divisions and regroupings of old interests. At least 12 will be linked in the traditional Ruhr vertical fashion with coal producers. They must, however, still compete for free coal to supplement the captive.

Paris Machine Tool Exhibit

Paris—More than 600 machine tool manufacturers in Europe and the Americas have registered for the first European Machine Tool Exhibition to be held here Sept. 1 to 10.

Tool, Die Orders for First Quarter Are 165 Pct Over 1950

Cleveland—Impetus of rearmament has pulled tool and die orders upward by the coat tails. Orders for the first quarter of 1951 are 165 pct ahead of the first quarter last year, according to an estimate disclosed by George S. Eaton, executive secretary of the National Tool & Die Manufacturers Assn.

The tool and die industry starts the chain reaction of vast American production by providing the basic equipment for manufacturing. Mr. Eaton said that one die installed on a press can turn out hundreds of thousands of parts.

He reported first quarter '51 shipments as being 150 pct ahead of corresponding shipments last year but 7 pct below shipments made in the last quarter of 1950. The NTDMA survey also points out that backlogs at the end of February were 225 pct over those a year ago.

Crucible Expansion to Hike Pig Iron, Steel, Alloy Capacity

Pittsburgh—Crucible Steel Co. of America's Midland, Pa., plant will undergo major enlargement in an expansion plan to be completed during 1952 at a cost of $27,250,000, said W. P. Snyder, Jr., chairman of the board.

Midland plans include: a new blast furnace, enlargement of openhearth and electric furnaces, a battery of 29 coke ovens, a new bar mill, improvements to the blooming and merchant bar mill, turbo blowers for blast furnaces, a new sintering plant, and auxiliary equipment.

Company plans will increase pig iron capacity by 60 pct, raise openhearth capacity by about 22 pct and electric furnace capacity by 37 pct. The Midland works will get more metallurgical coal with installation of additional trackless mechanical equipment at the firm's Greene County, Pa., coal mines. The expansion is authorized under certificates of necessity.

INDUSTRIAL SHORTS

River Terminal — The CONVERSE BRIDGE & STEEL CO. will build a modern steel handling terminal on the Tennessee River, at an estimated cost of $500,000.

Radar Contract—An $8,500,000 contract for the production of radar equipment for the Navy has been awarded to the WESTINGHOUSE ELECTRIC CORP., Springfield, Mass. The contract is for search-type radar sets.

Plant Addition—The construction of a $4 million plant addition of the ANACONDA AMERICAN BRASS CO., Toronto, will proceed. It will extend present facilities and include construction of a new copper department.

Ammunition Orders — RHEEM MFG. CO. has been awarded contracts for artillery ammunition totaling approximately $10,000,000 by the Birmingham Ordnance District of the U. S. Army. Work will start immediately at the company's New Orleans plant.

Locations Selected — Locations have been selected for two of CLEVELAND GRAPHITE BRONZE CO.'s five new branch plants. One plant will be constructed at Caldwell and the other at McConnellsville, both in southeastern Ohio.

Safety Honor — The National Safety Council has granted its highest honor, The Distinguished Service to Safety Award, to NATIONAL CARBON CO., New York, in recognition of the firm's record in reducing employee accident rates each year for 4 consecutive years.

Contract Awarded—A contract for moving hospital and restaurant buildings at the Indiana Harbor plant of the Youngstown Sheet & Tube Co., has been awarded the EICHLEAY CORP., Pittsburgh.

Sales Rep.—Wyckoff Steel Co. has appointed C. J. WHITE & CO. as sales representatives in the Texas Gulf Coast Area and Louisiana.

Buys Plant Site — COLD METAL PRODUCTS CO. has bought a 40-acre tract in Indianapolis near the Allison jet engine plant of General Motors Corp.

New Company — The newly formed ALLIED METAL SPECIALTIES, INC., 516 N. Charles St., Baltimore, has started operations and will specialize in custom-built metal fixtures.

New Acquisition—With the acquisition of the sub-fractional line from Robbins & Myers, JANETTE MFG. CO. of Chicago will now be producing Gear Motors with hp ratings from 1/150 up to and including 7½.

Doubles Capacity—One of Mexico's major steel mills, ALTOS HORNOS DE MEXICO, S. A., of Monclova, Coahuila, is doubling its capacity for the production of steel strip.

Plant Project—Canadian Steel Improvement, Ltd., a subsidiary of STEEL IMPROVEMENT & FORGE CO., has started construction of a plant in Toronto, Ont., for the production of jet engine parts, for A. V. Roe, Ltd.

Really Sticks—A rubber cement called Plastilock, developed by the B. F. GOODRICH CO., Akron, O., sticks metal to metal with a bond stronger than rivets or nuts and bolts can make, it is claimed.

Production Records—Plants of the U. S. STEEL CO. in the Chicago area broke 74 individual production records in March. The South Chicago works topped the previous 1942 record with 426,725 tons and the Gary works surpassed the former high of Jan. this year, with 539,927 tons.

BITS AND BRIEFS

By Bill Packard

Joe Stalin awarding prizes to Russian steel men for evolving a process for continuous casting of steel. Isn't it clever of the Americans and British to steal the Russian process and get it operating so quickly? . . . SKF Industries spending $10 million to expand ball-bearing capacity . . . **American Can planning to continue using tinless cans after emergency is over—regardless of what happens to price and availability of tin** . . . Right behind an Erie freight train wrecked at Tuxedo, N. Y., recently was a crack passenger train — carrying Erie's president and vice-president in a special car. Wreck was cleared in record time . . . West German steel output now at annual rate of more than 12 million tons a year . . . **Despite so-called "freeze," wage pot still bubbling over. Concessions already granted make sixth round wage increase inevitable** . . . Allegheny Ludlum-Pittsburgh Steel merger talks to grow warmer. Engineering reports will be ready for A-L meeting later this month . . . **Don't be fooled by temporary rail layoffs in some areas. They're partly caused by slowing coal shipments. Freight car shortage will get worse** . . . French engineers investigating extent of new iron ore deposits in Colomb-Bechar district of Algeria. Preliminary reports indicate ore of 65 to 70 pct Fe . . . Federal Reserve Board estimates industrial production in March reached a new postwar high . . . **Backers of Gibralter Steel Corp. making progress in reverse. Option on plant site allowed to expire and application for certificate of necessity never was filed** . . . American Safety Razor to operate shell-loading plant at La Porte, Ind. . . . We're picking the Red Sox because they've added pitching and Boudreau's spirit to their power. In the National the Giants might outscramble Bums and Phils, rated better on paper . . . MacArthur's dismissal doesn't lessen the Commie threat, or the size of the defense program . . . After looking at lists of manufacturers who file CMP forms and those who don't, some makers of consumer durables feel left out in the cold.

For Want Of A Strap, Production May Be Lost

Steel strapping shortage leaves shippers on hand-to-mouth inventory . . . One producer faced shutdown to prevent goods pileup . . . Need grows in basic industries—*By Gene Beaudet*

Chicago—Consumers and producers are watching with grave concern the growing demand for steel strapping—vitally important in shipment of military and essential civilian goods.

Orders of some major producers are running 60 to 70 pct ahead of last year. Industry sources feel a serious shortage will develop soon if strapping companies do not receive greater allocations of strip steel.

Major portion of strapping sold each year goes to basic industries such as steel, aluminum, copper, lumber, paper and textiles. Engaged in big expansion programs, these industries need more and more strapping as plans are completed.

Some prime contractors working on defense orders are required by government specifications to use strapping, especially for overseas shipments. Other shippers, short of cardboard cartons, are reusing cartons reinforced with strapping to prevent failures.

Switch to Strapping—A trend to more efficient materials handling techniques requires power lift trucks, pallets and automatic machines for tying and bundling.

STEEL PRODUCTION (Ingots and Steel for Castings)

As Reported to the American Iron & Steel Institute

	Openhearth		Bessemer		Electric		Total		Calculated	No.
1950	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons Weekly	Weeks in Month
Jan.	7,131,519	96.5	379,252	80.6	419,601	71.9	7,930,372	93.9	1,790,152	4.43
Feb.	6,142,178	92.0	255,565	60.2	395,502	75.0	6,793,245	89.1	1,698,311	4.00
Mar.	6,747,680	91.3	265,726	56.5	473,630	81.1	7,487,036	88.7	1,690,076	4.43
1st Qtr.	20,021,377	93.3	900,543	65.9	1,288,733	76.0	22,210,653	90.6	1,727,111	12.86
Apr.	7,314,733	102.2	407,909	89.5	490,030	86.7	8,212,672	100.4	1,914,376	4.29
May	7,897,837	102.8	437,006	92.9	517,044	88.6	8,551,887	101.3	1,930,449	4.43
June	7,218,570	100.9	406,944	89.3	506,001	89.5	8,131,515	99.4	1,895,458	4.29
2nd Qtr.	22,131,140	102.0	1,251,859	90.6	1,513,075	88.2	24,896,074	100.4	1,913,611	13.01
1st 6 Mos.	42,152,517	97.7	2,152,402	78.3	2,801,808	82.2	47,106,727	95.5	1,820,902	25.87
July	7,220,214	96.9	380,317	79.8	470,763	78.4	8,071,294	94.7	1,826,085	4.42
Aug.	7,315,215	98.0	405,118	84.8	509,984	84.7	8,230,317	96.3	1,857,859	4.43
Sept.	7,258,961	100.7	409,216	88.7	525,017	90.3	8,193,194	99.3	1,914,298	4.29
3rd Qtr.	21,794,390	98.5	1,194,651	84.4	1,505,764	84.4	24,494,805	96.7	1,865,560	13.13
9 Mos.	63,946,907	98.0	3,347,053	80.4	4,307,572	82.9	71,601,532	95.9	1,835,937	39.00
Oct.	7,731,280	103.6	436,835	91.5	571,980	85.0	8,740,095	102.3	1,972,933	4.43
Nov.	7,108,810	98.3	370,659	80.1	532,382	91.3	8,011,851	96.8	1,867,564	4.29
Dec.	7,431,358	99.8	380,011	79.8	531,922	88.6	8,343,291	97.9	1,867,622	4.43
4th Qtr.	22,271,448	100.6	1,187,505	83.8	1,636,284	91.7	25,095,237	99.0	1,909,835	13.14
2nd 6 Mos.	44,065,838	99.5	2,382,156	84.1	3,142,048	88.0	49,590,042	97.9	1,887,706	26.27
Total	86,218,355	98.6	4,534,558	81.3	5,943,856	85.2	96,696,769	96.7	1,854,560	52.14
1951										
Jan.	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
Feb.[1]	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
Mar.[2]	8,061,000	104.2	409,000	85.8	580,000	90.4	9,050,000	102.2	2,043,000	4.43
1st Qtr.	22,841,494	101.7	1,166,837	84.2	1,650,537	88.6	25,658,868	99.8	1,995,246	12.86

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,868,297 net tons openhearth, 106,195 net tons Bessemer and 131,786 net tons electric ingots and steel for castings, total 1,906,268 net tons; based on annual capacities as of Jan. 1, 1950 as follows: Openhearth 86,984,490 net tons, Bessemer 5,537,000 net tons, Electric,6,871,310 net tons, total 99,392,800 net tons. Beginning July 1, 1950, the percentages of capacity operated are calculated on weekly capacities of 1,685,059 net tons open hearth, 107,806 net tons Bessemer and 135,856 net tons electric ingots and steel for castings, total 1,928,721 net tons; based on annual capacities, as of July 1, 1950 as follows: Openhearth 87,858,990 net tons, Bessemer 5,621,000 net tons, Electric 7,083,510 net tons, total 100,563,500 net tons.

[1] Revised. [2] Preliminary.

These devices would be useless without sufficient steel strapping.

Of 113 big Cincinnati manufacturers recently surveyed by J. M. Moon, of Signode Steel Co., member of the strapping industry's advisory board to NPA, 39 pct reported they could not operate without strapping. These companies used 82.5 pct of the strapping consumed in the district.

Another 48 pct., accounting for 16 pct of district consumption, feared they could not obtain enough wooden boxes, fiber cartons, lumber and nails if the present supply of strapping dropped sharply.

Strapping producers are trying desperately to meet DO and civilian orders. Steel mill subsidiaries are in better shape than independents, but have no free ticket on materials. One such company that increased capacity 60 pct through expansion is now booked through October on DO's currently taking 85 pct of their production.

Orders Pile Up—One major producer figures present orders are 65 pct over last year while steel receipts are about equal. Issuance of the now-revised DO-97 had doubled the amount of DO tonnages some companies anticipated they would need during the first half of the year.

Consumer inventories are at an all-time low. Average inventory last June ran about 3 months. By Jan. 1950 this had fallen to a 1-month supply. Now many consumers are living hand to mouth. One large automobile supplier was recently down to a 2-day supply and faced a shutdown to prevent goods from piling up. Other industries, such as meat packers, are reported to have undergone similar experiences.

While increased allotments of steel strip will help, they are not the whole answer. The flood of DO's has made them meaningless as far as deliveries are concerned. Producers must be told what industries the government thinks most essential so the best interests of the defense program will be served.

Electrochemists Put Emphasis on Defense

New developments for mobilization feature 99th meeting of The Electrochemical Society . . . Interest focuses on plastics, liquid ozone, phosphors, jets, melting—*By Bill Czygan.*

Washington — New developments for the defense mobilization effort highlighted the 99th meeting of The Electrochemical Society, held here last week to commemorate the 50th anniversary of the National Bureau of Standards. Important findings in electric insulation, electronics, luminescence, rare metals, electrothermics and electrochemistry were covered in the 120 technical papers and round table discussions.

The Electric Insulation Div. with the American Institute of Electrical Engineers and the Society of Plastic Engineers discussed plastics in relation to dielectrics. Interest ran high in properties of plastic laminates, new and improved wires and cables, and electrolytic capacitors.

Pure Liquid Ozone—Probably the most spectacular portion of this division's program was a film by Armour Research Foundation presenting the manufacture and properties of pure liquid ozone. Liquid ozone may find application in guided missiles and other military uses not presently disclosed.

Recent discoveries of new phosphors prompted a number of papers on their properties and uses in luminescence. Researchers of Sylvania Electric Products, Inc., demonstrated the direct ex-

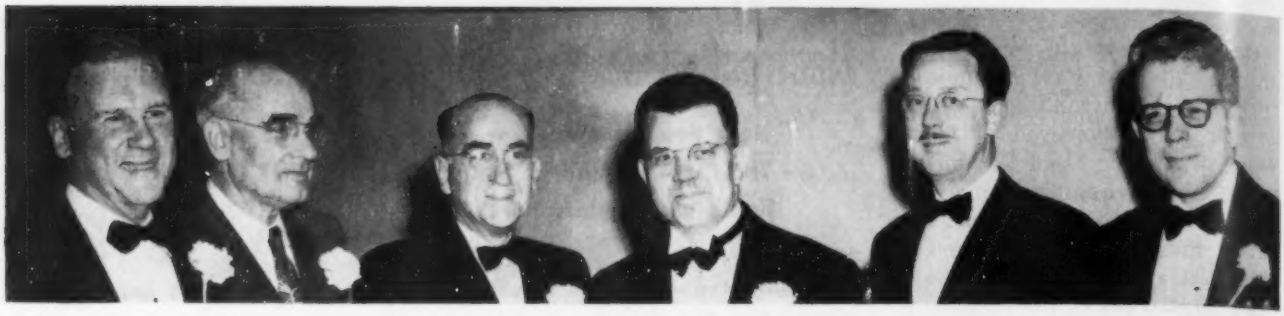
February Finished Steel Shipments

As Reported to the American Iron & Steel Institute

STEEL PRODUCTS	CURRENT MONTH Carbon	Alloy	Stainless	Total	Pct of Total Shipments	TO DATE THIS YEAR Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingots	65,771	16,976	1,758	84,505	1.5	148,223	32,645	3,343	184,211	1.5
Blooms, billets, tube rounds, sheet bars	133,905	38,788	1,110	173,803	3.0	*288,702	*82,888	2,316	*373,906	3.0
Skelp	9,708	.....	.....	9,708	0.2	19,965	.....	.....	19,965	0.2
Wire rods	63,066	1,970	341	65,377	1.1	*135,387	3,276	568	*139,231	1.1
Structurals	348,948	4,519	11	353,478	6.1	748,393	13,875	40	762,308	6.0
Steel piling	24,155	.....	.....	24,155	0.4	63,684	.....	.....	63,684	0.5
Plates	491,871	29,223	1,030	522,124	9.0	1,085,067	65,000	2,647	1,152,714	9.1
Rails—standard	108,351	27	.....	108,378	1.9	255,149	57	.....	255,206	2.0
Rails—light	7,063	8	.....	7,071	0.1	18,625	18	.....	18,643	0.1
Joint bars	10,048	.....	.....	10,048	0.2	21,387	.....	.....	21,387	0.2
Tie plates	34,205	.....	.....	34,205	0.6	76,904	.....	.....	76,904	0.6
Track spikes	12,202	.....	.....	12,202	0.2	27,186	.....	.....	27,186	0.2
Wheels	30,353	6	.....	30,359	0.5	64,604	11	.....	64,615	0.5
Axles	17,301	43	.....	17,344	0.3	34,170	77	.....	34,247	0.3
Bars—hot-rolled	477,832	163,178	3,105	644,115	11.2	1,048,812	355,182	6,730	1,410,724	11.2
Bars—reinforcing	141,189	.....	.....	141,189	2.4	296,435	.....	.....	296,435	2.3
Bars—cold-finished	112,628	22,328	3,072	138,028	2.4	244,007	50,944	6,750	301,701	2.4
Bars—tool steel	2,209	10,300	.....	12,509	0.2	*4,558	*20,729	.....	*25,287	0.2
Standard pipe	197,119	21	4	197,144	3.4	*445,894	204	6	*446,104	3.5
Oil country goods	117,321	15,328	.....	132,649	2.3	250,034	33,610	.....	283,644	2.2
Line pipe	211,240	88	.....	211,328	3.7	449,686	343	.....	450,029	3.6
Mech. tubing	49,468	19,846	528	69,842	1.2	106,856	41,814	1,039	149,709	1.2
Pressure tubing	18,064	1,319	637	20,020	0.3	41,319	3,118	1,436	45,873	0.4
Wire—drawn	248,488	4,127	2,224	254,839	4.4	530,800	8,363	4,698	543,861	4.3
Wire—nails, staples	66,807	.....	6	66,813	1.2	144,585	.....	6	144,591	1.1
Wire—barbed, twisted	16,222	.....	1	16,223	0.3	37,444	.....	5	37,449	0.3
Wire—woven fence	31,538	.....	.....	31,538	0.5	71,085	.....	.....	71,085	0.6
Wire—bale ties	7,680	.....	.....	7,680	0.1	15,837	.....	.....	15,837	0.1
Blackplate	74,665	.....	.....	74,665	1.3	132,388	.....	.....	132,388	1.0
Tin & terneplate—hot dipped	110,054	.....	.....	110,054	1.9	*267,763	.....	.....	*267,763	2.1
Tinplate—electrolytic	189,164	.....	.....	189,164	3.3	*432,943	.....	.....	*432,943	3.4
Sheets—hot-rolled	610,565	24,897	2,596	638,058	11.1	1,353,533	57,812	5,653	1,416,998	11.2
Sheets—cold-rolled	752,872	8,390	7,475	768,737	13.3	*1,630,874	*19,481	16,428	*1,666,783	13.2
Sheets—galvanized	145,357	843	.....	146,200	2.5	323,452	3,147	.....	326,599	2.6
Sheets—other coated	17,315	.....	.....	17,315	0.3	39,989	.....	.....	39,989	0.3
Sheets—enameling	16,089	.....	.....	16,089	0.3	38,789	.....	.....	38,789	0.3
Elec. sheets, strip	9,776	45,092	.....	54,868	1.0	*23,399	*99,383	.....	*122,782	1.0
Strip—hot-rolled	193,516	3,288	672	197,476	3.4	*426,511	7,201	1,019	*434,731	3.4
Strip—cold-rolled	149,454	2,559	15,116	167,129	2.9	*313,574	*4,623	32,902	*351,099	2.8
TOTAL	5,323,379	413,164	39,686	5,776,229	100.0	*11,658,013	*903,801	85,586	*12,647,400	100.0

During 1949 the companies included above represented 99.0% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.



ANNIVERSARY: Electrochemists gathered in Washington last week for 50th anniversary of the National Bureau of Standards and 99th meeting of the Electrochemical Society. Included, left to right, were: R. J. McKay, International Nickel Co., Inc., vice-president of the Society; M. J. Udy, consultant, newly elected vice-president; Dr. R. M. Hunter, Dow Chemical Co., new president of the Society; Dr. E. U. Condon, Director, National Bureau of Standards; Dr. C. L. Faust, Battelle Memorial Institute, retiring president; and Dr. H. B. Linford, Columbia University, Society secretary.

citation of phosphors by electric fields.

A piece of conducting glass is coated with a thin layer of phosphor, which in turn receives a thin coating of aluminum or other metal. When current is applied, the electrical energy is converted directly into light by the action of the fluctuating electrical field on the solid.

Jets and Rockets—High temperature processes, materials and tests were of primary interest in the Electrothermics Div. symposia, pointing toward accelerated jet engine and rocket developments. Increased interest in new methods of obtaining and measuring high temperature reactions was evident, and emphasis was placed on better high temperature materials to alleviate the drain on the strategic material stockpile.

Zirconium (for nuclear physics) and titanium processing require high temperature electric furnace operations. New information was presented on the art of melting to allow improved design. Heat losses in arc furnaces, types of electrodes and methods for oxygen removal in zirconium were covered.

The electric furnace field is growing; new designs previously considered unconventional are now going into production. Improved means for measuring high temperatures were also stressed, and greater importance was placed on refractories for higher temperatures.

Metal bonded carbides and other new materials coming out of the research laboratories were discussed. These materials, neither ceramics nor metals, offer structures and compositions urgently needed in defense.

The growing importance of molybdenum was shown in a number of papers. Methods of recovery, purification and electrodeposition of germanium also placed high.

DPA Lists Fast Writeoffs for 396 Facilities

Total of certificates of necessity through Apr. 6 reach $4 billion . . . Lion's share of approvals go to basic industries . . . One third of projects to cost less than $500,000.

Washington—Certificates of necessity for 396 new or expanded defense facilities have been granted by the Defense Production Administration. The facilities, to cost over $1.3 billion, raise total approved as of Apr. 6 to $4 billion.

Of the projects for which certificates have been issued, one-third will cost $500,000 or less. Biggest share of approvals have been for basic industries essential development of the defense program.

The 396 certificates were issued during the period Mar. 7 through Apr. 6. Holders of the certificates are permitted to deduct from taxable income 40 to 100 pct of the cost of the facilities during the next 5 years. Normal amortization allowed is from 20 to 25 years.

Company	Product, Use	Pct. Certified
Applied	Eligible	
Continental Machines	Machinery, gages	
$262,250	$262,250	85
Onsrud Machine Works	Machine tools	
$26,629	$26,629	90
Three M Tool & Die Co.	Machine tools, dies	
$15,000	$15,000	75
Swan Eng. & Machine Co.	Tools, dies	
$26,194	$26,194	80
Jefferson Eng. & Mfg. Co.	Tank components	
$118,782	$118,782	85
Red Arrow S.S. Co.	Transportation	
$325,000	$325,000	80
Hobart Bro's. Co.	Welders	
$13,787	$13,787	75
Dresel-Betz Co.	Dies, jigs	
$44,461	$44,461	90
Harvey Machine Co.	Aluminum	
$95,000,000	$94,700,000	85
Reynolds Metals	Aluminum	
$79,665,278	$78,365,278	80
Aluminum Co. of America	Housing	
$2,000,000		
Calhoun Devel'nt Co.	Housing	
$2,173,776		
Aluminum Co. of America	Aluminum	
$60,000,000	$64,775,236	80
Calhoun Devel'nt Co.	Housing	
$1,200,000		
Chicago & Eastern Illinois R.R.	Transportation	
$363,761	$363,761	80
Seaboard Air Line R.R.	Transportation	
$851,000	$851,000	65
Jackson Iron & Steel	Silvery pig iron	
$2,438,550	$2,438,550	85
Timken-Detroit Axle Co.	Axles	
$732,302	$732,302	90
Timken-Detroit Axle Co.	Axles	
$429,014	$429,014	80
Timken-Detroit Axle Co.	Axles	
$4,878	$4,878	75
Timken-Detroit Axle Co.	Axles	
$49,760	$49,760	85
Timken-Detroit Axle Co.	Axles	
$309,970	$309,970	80
Allegheny Ludlum	Steel ingots	
$3,242,000	$3,242,000	75
Cleveland Pneumatic Tool	Landing gear	
$702,231	$688,231	80
Cleveland Pneumatic Tool	Landing gear	
$375,000	$350,000	75
Sylvania Electric	Tubes	
$4,277,322	$4,252,322	70
Solar Aircraft Co.	Engine parts	
$1,750,000	$1,679,000	75
Solar Aircraft Co.	Engine parts	
$23,486	$23,486	85

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SUBCONTRACTORS:

CAN YOU MAKE IT?

New York—As production schedules shape up, the flow of subcontract orders from prime contractors is rapidly growing. Many primes, however, still report difficulty in obtaining capable subcontractors to handle unusual parts.

Subcontract orders are being rushed to help offset mounting hardships of shortages of materials. Inventories of materials for some small manufacturers have reached the exhaustion point.

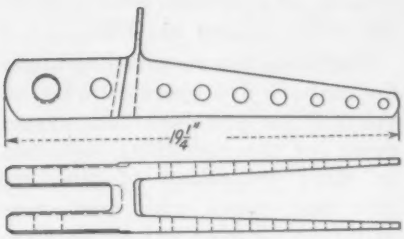
The bulk of subcontract orders, however, is yet to be issued. Business owners who have to keep plants rolling to meet constant operating costs will find a wide variety of work available.

Rising costs have hurt many small business owners stymied by price controls on the sales end. For these, conversion to defense work offers substantial aid. Exemptions of much work from price regulations offers a financial breather.

Overlooked by many is the desire of the government and prime contractors to have more than one source of supply. Dispersion of subcontract orders insures constant supply in the event of emergency. This, however, doubles the opportunity for small shop owners to take part in the defense program.

Iron Age SC 8

Machine from Nitralloy forging
Hardness: Case, Rockwell 15-N, 91.5 min; core, Rockwell C 25-32
Finish: 32 microinches, RMS
Backlash: 0.002 in.
Requirements: 100 per month
Part No. 127323, Purchasing Dept. Curtiss-Wright Corp., Caldwell, N. J.

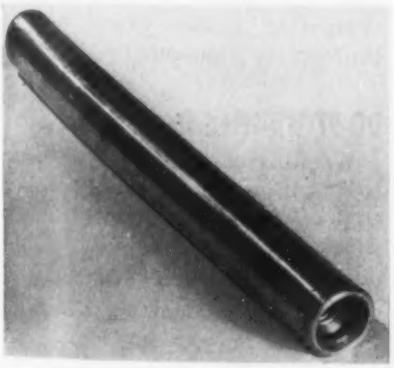


Iron Age SC 5

Machine from AMS 4340 die forging.
Heat Treat to 170,000-190,000 psi per AN-QQ-H-201; RC 39-42.
Magnaflux per AN-1-32.
Finish: all mach. surfaces to 100 microinches.
Tolerances: 0.0024 to 0.010 in.
Quantity: 20, plus 20 similar parts.
Part No. 85-124-02, H. A. Hoffmann, Jr., PA, East Coast Aeronautics, Inc., 896 So. Columbus Ave., Mt. Vernon, N. Y.

Iron Age SC 11

Machine from AMS-6260 forging.
Max. size: Approx. 6¾ in. by 1¾ in.
Tolerances: 0.001 in. to 0.010 in.
Carburized and hardened.
Core hardness Rockwell C32-40.
Case hardness Rockwell C60-63.
Finish: 8-16-32 microinches.
Requirements: 290 to 500 per month.
Part No. 133995, Subcontracting Dept., Wright Aeronautical Corp., Wood-Ridge, N. J.



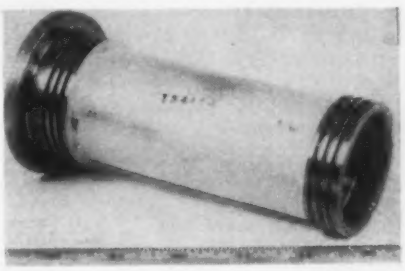
Iron Age SC 10

Machine from AMS-4625 bronze bar stock.
Tapped hole, centerless grinding.
Max. size: 5½ in. x ⅝ in.
Tolerances: 0.0005 to 0.030 in.
Finish: 25 microinches.
Requirements: 570 to 1200 per month.
Part No. 134732, Subcontracting Dept. Wright Aeronautical Corp., Wood-Ridge, N. J.

Send a picture or simple inked sketch of the part to be subcontracted, with the part number, approximate size, tolerances, material, machine work needed, quantity required and address to:

"CAN YOU MAKE IT?" EDITOR
THE IRON AGE
100 EAST 42ND STREET
NEW YORK 17, N. Y.

Small manufacturers interested in obtaining defense work are urged to contact the prime contractor directly.



Iron Age SC 20

Machine from Nitralloy forging.
Hardness: Core, 241-285 Brinell.
Case, 15N92 minimum.
Finish: 6 microinches on grooves, face; 32 microinches on ID.
Tolerances: 0.002 in. to 0.020 in.
Requirements: 500 per month.
Part No.: 134403, Subcontracting Dept., Wright Aeronautical Corp., Wood-Ridge, N. J.

CONTROLS DIGEST

Industry Controls This Week:

NPA Orders

M-4, Construction — Amendment bans swimming pools, permits tobacco auction houses in some cases.

M-12, Copper for utilities—Electric power utilities are exempted from copper controls as far as use of copper products is specified in M-50. Effective Apr. 9.

M-50, Electric utilities — Copper wire and brass mill and foundry items are added to items available to electric power industry. Effective Apr. 9.

M-56, Feathers—Controls waterfowl feathers. Effective Apr. 16.

M-57, Tanning materials—Controls vegetable tanning materials. Effective Apr. 16.

Reg. 4, Amended—Cancels use of DO-97 for chemicals, nylon fiber and yarns, packaging materials, paint, paperboard, photo film, rails and accessories, rubber tires and tubes, and items listed in list A of M-47. Effective Apr. 16.

Reg. 3, Canadian-U. S. priorities—Extends to Canadian companies the right to apply for MRO assistance, and designates Canadian "distributors and importers" as eligible for priority aid. Effective Apr. 16.

DMA Authorization Needed To Accept Zinc Ore Under Toll System

Washington—The Defense Minerals Administration has placed restrictions upon the delivery and acceptance of zinc ore under toll agreements.

Mineral order 3 prohibits delivery or acceptance of zinc ore for processing under a toll agreement, existing or proposed, without written authorization by DMA.

No forms are required to apply for authority to operate under an existing or proposed toll agreement for the remelting, refining, or other processing of zinc ore into zinc metal, zinc dust, zinc pigments, or zinc salts. Applications can be made by letter to the Defense Minerals Administration, U. S. Dept. of the Interior, Washington 25, D. C. The letter of application must contain the following information:

Names and addresses of the parties to the toll agreement, the kind, grade, and form of zinc ore involved, the tonnage of the zinc products resulting after processing, the estimated rate and dates of delivery of the zinc products, the duration of the toll agreement, the purposes for which the processed zinc products are to be used, and any other information that the applicant may care to include.

Canada to Set Up Order To Control Use of Scarce Materials

Ottawa — The Dept. of Trade and Commerce expects to set up by the middle of the summer an order approval system to conserve scarce materials. Makers of civilian goods seeking steel, base metals and other raw materials will need approval from the civilian supplies branch in the Trade Dept. Approvals will be based on previous use, degree of essentiality, and military demand.

There will also be a system of import controls which is not expected to be too harsh. If, for example, a maker of domestic stoves is required to eliminate a warming oven or anything else, to save steel, the import permit control will prevent importation of competing goods which do not conform to steel-saving design.

DO-97 Whittled Down by NPA

Washington—National Production Authority this week took initial steps to prevent interference with defense production by the piling up of MRO orders.

In an amendment to Reg. 4, effective at once, some scarce materials (Table 1) have been excluded from application of DO-97 ratings. These are:

All items in List A of M-47, rails, tie plates, track spikes, splice bars, rail joints, frogs and switches, rubber tires and tubes, paint, lacquer and varnish, packaging materials and containers, paper and paper products, and all basic, organic or inorganic chemicals.

Further changes in Reg. 4 are being worked out but NPA said these will not affect items given above. In addition allocation programs are being set up for some of the scarcer materials.

Defense Contracts to Metalworking Industry

Selected Contracts, Week of Apr. 16, 1951

Item	Company
Torpedo container	Pittsburgh-Des Moines Steel Co., Pittsburgh
Rebuilding rifles	Underwood Corp., New York
Pumps	Warren Steam Pump Co., Inc., Warren, Mass.
Horns	Federal Enterprises, Inc., Chicago
Switches	Allis-Chalmers Mfg. Co., Milwaukee
Generators	Allis-Chalmers Mfg. Co., Milwaukee
Generators	Bogue Electric Mfg. Co., Paterson, N. J.
Wire recorder	Air King Products Co., Brooklyn, N. Y.
Actuator	Air Associates Inc., Teterboro, N. J.
Rotor assy.	Bendix Aviation Corp., Teterboro, N. J.
Gauge	Thomas Edison, Inc., West Orange, N. J.
Starters	Pioneer Electronics Corp., Salem, Mass.
Parts	The Emerson Electric Mfg. Co., St. Louis
Carburetor assys.	Bendix Aviation Corp., South Bend
Instruments parts	Bendix Aviation Corp., Teterboro, N. J.
Valve parts	Bendix Aviation Corp., North Hollywood, Calif.
Radio sets	Bendix Radio Div., Bendix Aviation Corp., Baltimore
Airplane parts	North America Aviation, Inc., Los Angeles
Radio sets	Federal Mfg. & Eng. Corp., Brooklyn, N. Y.
Parts	Sperry Gyroscope Co., Great Neck, N. Y.
Parts	R. C. Allen Business Machines, Inc., Grand Rapids
Generator assy.	Hartmen Electrical Mfg. Co., Mansfield, Ohio
Indicator	The Lewis Engineering Co., Naugatuck, Conn.
Indicator	Kollsman Instrument Corp., Elmhurst, N. Y.
Radio sets	Bendix Aviation Corp., Teterboro, N. J.
Radio receivers	Setchell Carlson, Inc., New Brighton, Minn.
Compass assy.	Sperry Gyroscope Co., Great Neck, N. Y.
Generators	Westinghouse Electric Corp., Dayton
Radio components	Bendix Aviation Corp., Baltimore
Radio compass components	Magnavox Co., Fort Wayne, Ind.
Radio compass components	Fairchild Camera & Instrument Corp., Jamaica, N. Y.
Fuel valve	Pesco Div., Bedford, Ohio
Starter assy.	Jack & Heintz Precision Instr., Cleveland
Position indicator	General Electric Co., Schenectady

Fast Tax Writeoffs

Continued from Page 106

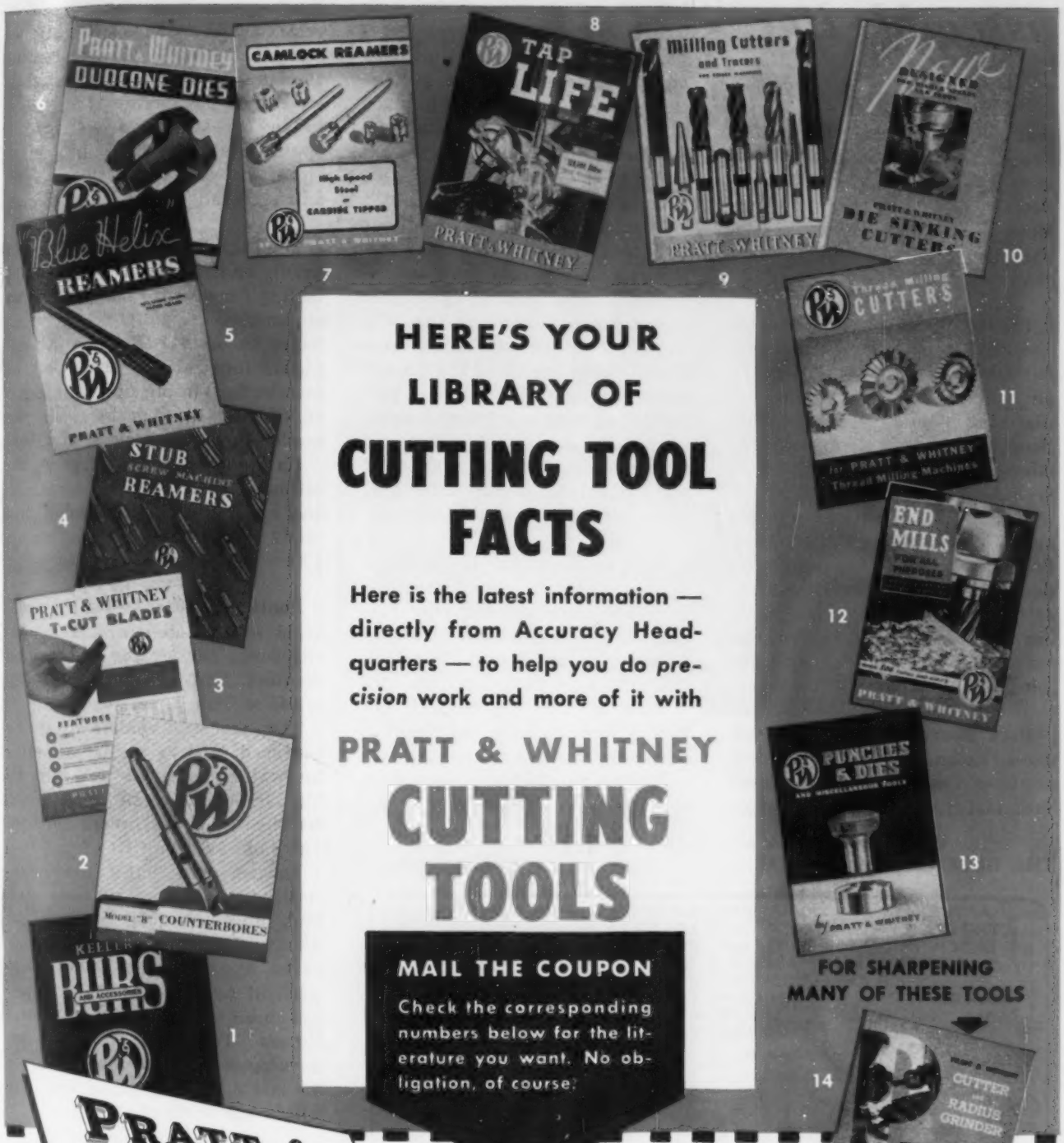
Company	Product, Use	Pct. Certified
Applied	Eligible	
Solar Aircraft Co. $1,250	Engine parts $1,250	75
Solar Aircraft Co. $109,347	Engine parts $109,347	85
Solar Aircraft Co. $158,549	Engine parts $158,549	75
Solar Aircraft Co. $15,284	Engine parts $15,284	85
Sylvania Electric $2,899,335	Tungsten, molybdenum $2,899,335	80
Solar Aircraft Co. $152,653	Engine parts $152,653	80
Virginia Smelting Co. $1,265,485	Zinc, chlorine $1,265,485	75
Atlantic Coast Line R.R. $2,330,000	Transportation $2,330,000	50
St. Joseph Lead Co. $1,468,070	Slab zinc $1,468,070	75
Randolph Metals Co. $49,753	Slab zinc $49,185	75
Manasco Mfg. Co. $771,634	Landing gears $663,634	80
Ahlberg Bearing Co. $550,000	Bearings $550,000	85
Seaboard Air Lines R.R. $267,500	Transportation $267,500	65
Torrington Co. of Indiana $312,549	Bearings $312,549	85
Sheridan Towing Co. $550,000	Transportation $550,000	70
Tyson Bearing Corp. $71,515	Bearings $71,515	90
W. J. Bullock 765,000	Nonferrous metals $765,000	75
B. & M. Towing Co. $569,882	Transportation $319,882	80
	$250,000	70
George Sall Metals Co. $665,000	Nonferrous metals $615,000	75
McAllister Bros. $140,375	Transportation $140,375	70
Ohio Steel Foundry Co. $1,001,622	Mill rolls $1,001,622	80
American Barge Lines $1,513,609	Transportation $970,806	80
N.Y., Chicago & St. Louis R.R. $2,452,007	Transportation $2,452,007	80
Lebanon Steel Foundry $891,591	Castings $891,591	75
Atlantic Coast Line R.R. $21,393,333	Transportation $21,393,333	65
Tyson Bearing $1,145,000	Bearings $1,145,000	90
Continental Sulphur & Phosphate Corp. $1,850,000	Sulphur $1,850,000	85
United Drill & Tool Corp. $133,617	Cutting tools $133,617	90
Champion Forge Co. $470,296	Forgings $470,296	80
Seaboard Airlines R.R. $3,184,000	Transportation $3,014,000	65
Fairchild Eng. & Airpl. Corp. $36,309	Air conditioner $36,309	85
Fairchild Eng. & Airpl. Corp. $11,202	Ordnance $11,202	85
Fairchild Eng. & Airpl. Corp. $5,979	Engines $5,979	75
Ford Motor Co. $2,925,577	Oil pumps $2,925,577	75
General Motors $235,760	Bearing adjustors $236,760	90
General Motors $40,275	Spark plugs $40,275	75
Menasco Mfg. Co. $350,000	Landing gears $350,000	75
General Motors $1,598,000	Engine parts $1,598,000	75
General Motors $276,672	Bearings $276,672	90
Good-All Electric Mfg. Co. $200,000	Condensers $200,000	75
Borg-Warner Corp. $150,000	Aircraft assemblies $150,000	75
Kaiser Aluminum $5,870,500	Aluminum $5,870,500	80
Kaiser Aluminum $364,006	Aluminum $364,006	80
Titeflex, Inc. $289,065	Radio components $289,065	80
General Motors $180,655	Propeller assy. $180,655	90
Goodyear Aircraft Corp. $200,929	Aircraft parts $200,929	80
Reynolds Metals Co. $4,300,000	Aluminum $4,300,000	80
Reynolds Aluminum Co. $475,450	Aluminum $475,450	80
Jones & Laughlin $1,533,250	Pipe, tubing $1,377,000	60
Jones & Laughlin $789,000	Iron recovery $742,050	85
Marine Fuel Transfer Corp. $255,000	transportation $225,000	80
Red Star Towing & Trans. Co. $75,000	Transportation $75,000	80
Red Star Towing & Trans. Co. $225,000	Transportation $225,000	80
Red Star Towing & Trans. Co. $350,000	Diesel tug $350,000	70
New York, Chicago & St. Louis R.R. Co. $4,889,548	Transportation $4,889,548	65
Boeing Airplane Co. $4,941,916	Aircraft $4,941,916	85
Bergen Wire Rope Co. $60,000	Wire conductors $60,000	75
AVCO Mfg. Corp. $20,675	Assemblies $20,675	90
Allegheny Ludlum Steel Corp. $3,200,000	Stainless steel $3,200,000	70
Lockheed Aircraft Corp. $3,666,693	Airplanes $3,371,238	85
Bell Aircraft Corp. $250,000	Engineering $250,000	75
Heli Coil Corp. $244,429	Bushings, tools $244,429	80
Jack & Heints Prec. Ind's. Inc. $410,900	Elect. equip. $410,900	90
Fairchild Eng. & Airpl. Corp. $12,357	Engine parts $2,414	75
Fairchild Aircraft Div. $83,118	Airplanes $71,456	80
Jones & Laughlin $495,000	Transportation $495,000	60
Jones & Laughlin $93,000	Slag handling $93,000	85
Jones & Laughlin $9,392,743	Steel $3,777,987	60
General Motors $277,781	Actuators $277,781	90
Consolidated Vultee $144,851	Aircraft $144,851	75
Wyman-Gordon Co. $4,848,200	Crank shafts $4,848,200	80
Rockwood Oil Terminals, Inc. $100,817	Transportation $100,817	80
Bouchard Trans. Co., Inc. $242,500	Oil barge $242,500	80
Worthington Pump & Mach'y $211,470	Welding equip. $211,470	90
National Steel $422,895	Steel $422,895	85
B. No. 70 Corp. $242,500	Oil barge $242,500	80
River Company, Inc. $850,000	Transportation $510,000	80
	$340,000	70
Larson & Quigley Co. $37,348	Engine parts $37,348	90
Thompson Industries $14,129	Bearings $14,129	90
Union Tank Car Co. $3,279,000	Transportation $3,279,000	80
Union Tank Car Co. $3,185,000	Transportation $3,185,000	80
Aluminum Co. of America $912,900	Aluminum $912,900	80
United Aircraft $329,855	Ordnance $329,855	80
Jones & Laughlin $379,600	Steel $379,600	75
Jones & Laughlin $104,600	Steel $101,900	75
Genesee Transporting Co. $800,000	Transportation $300,000	80
	$500,000	70
Petco Corp. $350,000	Transportation $350,000	70
Bloom Eng. Co. $165,080	Equipment $157,080	80
B. G. Corp. $1,400,000	Spark plugs $1,400,000	75
Enineering Reproduction $95,000	Reproductions $75,000	75
Talley Machine & Mfg. Corp. $27,434	Parts $27,434	90
Cargo Carriers, Inc. 700,000	Transportation $325,000	80
	$375,000	70

Company Applied	Product, Use Eligible	Pct. Certified
Heim Co. $20,878	Bearings $20,878	90
H. Levine Cooperage $267,659	Steel drums $267,659	50
Research Welding & Eng. Co. $16,500	Assemblies $16,500	90
Seaboard Air Line R.R. $247,000	Transportation $247,000	65
Samuel Greenfield Co. $136,621	Steel scrap $126,621	75
Union Tank Car Co. $2,275,000	Transportation $2,275,000	60
J. E. Baker Co. $2,038,895	Dolomite $2,038,895	85
Ethyl Corp. $45,000,000	Antiknock $44,135,000	85
Ethyl Corp. $4,041,000	Antiknock $4,041,000	75
Ethyl-Dow Chemical Co. $8,185,000	Ethylene $8,185,000	100
National Grinding Wheel Co. $295,117	Abrasives $295,117	75
Patapsco & Back Rivers R.R. $523,000	Transportation $360,000 $163,000	75 65
Phila., Beth. & N.E. R.R. $200,000	Transportation $200,000	75
Union Tank Car Co. $4,550,000	Transportation $4,550,000	80
General Motors $1,744,282	Diesels $1,744,282	75
Siskin Steel & Supply Co. $59,792	Steel scrap $39,792	75
Worthington Pump & Mach'y $285,906	Pumps $285,906	85
Slabe Machine Prod's Co. $23,885	Engine parts $23,885	90
American Non-Gran Bronze Co. $60,413	Engine parts $60,413	85
Atlas Steel & Supply Co. $102,040	Steel scrap $102,040	75
Lederer Iron & Steel Co. $98,253	Scrap iron $98,253	75
Alaska Junk Co. $70,000	Scrap iron $30,000	75
Apex Steel & Supply Co. $142,700	Steel scrap $142,700	75
Greer Hydraulics, Inc. $335,000	Testing equip. $325,000	75
Dover Stamping Co. $3,917	Steel drums $3,917	75
Dow Corning Corp. $1,460,000	Rubber $1,460,000	75
Lufkin Foundry & Mach'y Co. $100,000	Pump units $100,000	75
Texas Vitrified Pipe Co. $250,000	Pipe $250,000	75
Litton Industries $260,227	Tubes $248,277	85
Steel City Iron & Metal Co. $14,616	Steel scrap $14,616	75
Seaboard Refractories $174,700	Refractories $174,700	85
Fitzgibbon Boiler Co. $1,750,000	Hulls $1,750,000	75
Murray Refractories Co. $86,890	Refractories $86,890	85
Landowne Steel & Iron $6,500	Ordnance $6,500	75
Minneapolis-Honeywell $750,000	Instruments $731,000	75
Bol, Ltd. $11,201	Research $11,201	80
Powers Regulator Co. $2,378,390	Valves $1,588,390	75
M. Cohen & Son Co. $53,591	Steel scrap $53,591	75
Jackson Iron & Metal Co. $20,668	Steel scrap $20,668	75
Mayer Pollock $75,000	Steel scrap $75,000	75
Hoyne Iron & Steel Co. $150,111	Copper scrap $146,000	75
Euclid Road Mach'y Co. $2,017,762	Scrapers $2,017,762	50
Great Lakes S.S. Co. $216,500	Transportation $216,500	80
Goodyear Aircraft Corp. $269,690	Wheels $269,690	85
California Bag & Metal Co. $69,000	Metal scrap $69,000	75
Kaufman Iron & Metal Co. $26,568	Scrap iron $26,568	75
Ace Iron & Metal Co. $119,366	Scrap iron $119,366	75

Company Applied	Product, Use Eligible	Pct. Certified
Hartford Mach. Screw Co. $428,402	Engine parts $426,213	85
Laclede-Christy Co. $347,000	Firebrick $347,000	85
Patapsco & Back Rivers R.R. $300,000	Transportation $300,000	75
South Buffalo R.R. Co. $995,000	Transportation $600,000	75
	$395,000	65
Crouse-Hinds Co. $5,098,985	Fittings $5,098,985	75
Sun Oil Co. $2,577,145	Gasoline $2,577,145	100
Taylor Refining Co. $5,057,493	Gasoline $5,057,493	75
Kellex Corp. $285,000	Research $260,000	75
A. P. Ward & Son, Inc. $140,000	Transportation $140,000	70
Hardinge Bros., Inc. $128,957	Lathes $128,957	85
Aluminum Co. of America $43,564,618	Aluminum $5,209,375	80
Clearfield Clay Prod. Co. $1,338,765	Brick $1,333,765	85
General Refractories Co. $189,820	Brick $189,820	85
General Refractories Co. $462,000	Brick $462,000	85
General Refractories Co. $63,000	Brick $63,000	85
General Refractories Co. $3,782,550	Brick $3,782,550	85
General Refractories Co. $541,920	Brick $541,920	85
C. A. Dunham Co. $109,418	Valves $109,418	75
Standard Oil Co. of Ind. $10,029,000	Gasoline $10,029,000	80
Standard Oil Co. of Ind. $2,327,500	Gasoline $2,327,500	100
Mechanics Universal Joint Div. $270,000	Assemblies $270,000	75
Climax Fire Brick Co. $363,200	Refractories $363,200	85
Laclede-Christy Co. $140,500	Firebrick $140,500	85
Red Bank Div. $142,377	Dynamotors $142,377	85
Friez Instrument Div. $93,861	Instruments $93,861	85
Bendix Radio Corp. $1,026,882	Communications $1,008,474	75
Laclede-Christy Co. $125,000	Firebrick $125,000	85
Laclede-Christy Co. $200,000	Firebrick $200,000	85
Laclede-Christy Co. $220,000	Firebrick $220,000	85
Dana Corp. $5,825,822	Trans. devices $5,750,000	75
Fairfield Mfg. Co. $2,930,889	Gears $2,917,389	75
Fulton & Olmstead $12,000,000	Gasoline $11,925,000	80
Burgess Battery Co. $42,000	Batteries $40,000	75
Clover Box & Mfg. Co., Inc. $3,466	Nose assembly $3,466	80
W. R. Cranes Co. $35,000	Construction $35,000	75
Tennessee Eastman Corp. $755,000	Hydroquinone $755,000	60
Carborundum Co. $3,273,000	Aluminum oxide $3,233,000	50
Kansas City Southern Ry. Co. $3,375,000	Transportation $3,375,000	65
American Elec. Motors $22,635	Motors $4,246	85
Shipowners & Merchants Towboat $250,000	Towboat $250,000	70
Shipowners & Merchants Towboat $250,000	Towboat $250,000	70
Karl Douglas Co. $20,588	Landing gear $20,588	90
American Dis't Steam Co. $473,162	Foundry $473,162	80
Steelton & Highspire R.R. Co. $275,000	Transportation $200,000	75
	$75,000	65
Gerotor May Corp. $203,680	Valves $203,680	85
U. S. Rubber Co. $86,742	Hose $86,742	75
U. S. Rubber Co. $13,693	Panels $13,693	75
Monroe Scrap Metal, Inc. $125,000	Scrap iron $125,000	75

• News of Industry •

Company Applied	Product, Use Eligible	Pct. Certified
Brown & Root, Inc. $329,933	Tanks $329,933	75
Strom Steel Ball Co. $915,000	Steel balls $790,000	80
Gerotor May Corp. $42,895	Valves $42,895	75
Granite City Steel Co. $71,250,000	Steel $63,033,900	80
Wm. L. Gilbert Clock $4,693	Fuses $4,693	85
Kaiser Aluminum $915,472	Dolomite $915,472	70
Indiana Gear Works $94,535	Gear units $92,835	85
Ga., Fla. & Ala. R.R. Co. $93,572	Transportation $93,572	65
Peerless Tool & Eng. Co. $149,087	Engine parts $149,087	90
Wyckoff Steel Co. $685,350	Steel $685,350	60
Wyckoff Steel Co. $118,385	Steel $118,385	60
Manlove Mfg. Co. $10,989	Valves $10,989	90
Monarch Steel Co. $300,000	Steel $300,000	60
Associated Iron & Metal Co. $51,076	Scrap iron $40,030	75
Wisconsin-Appleton Co. $1,293,419	Castings $1,293,419	75
Metal Fabricators Corp. $29,000	Engine parts $29,000	75
Cameron Iron Works $2,915,417	Rings $2,915,417	75
Bendix Aviation Corp. $1,196,843	Landing gear $1,183,668	80
Stoner Mfg. Co. $144,649	Cartridge cases $144,649	75
Lake Erie Eng. Corp. $271,758	Presses $271,758	80
Nat'l Radiator Co. $4,617,530	Iron powder $4,592,530	60
Greenback Metal Powder Co. $4,741,605	Iron powder $4,726,605	60
Monsanto Chem. Co. $7,500,000	Phosphorus $7,450,000	50
St. Paul & Tacoma Lumber Co. $600,000	Chips $485,000	65
Bower Roller Bearing Co. $2,247,686	Bearings $2,122,686	85
Stanley Works $906,182	Steel $906,182	60
Ashland Oil & Refining $3,870,000	Gasoline $3,870,000	75
Gladding, McBean & Co. $1,712,089	Refractories $1,683,589	85
Gladding, McBean & Co. $710,050	Brick $655,050	85
Chrysler Corp. $196,991	Housings $196,991	90
Johns Hartford Tool Co. $8,038	Engine parts $8,038	90
Rockport S.S. Co. $1,000,000	Transportation $1,000,000	80
Premier Petroleum Co. $3,580,000	Gasoline $3,580,000	75
Westvaco Chem. Div. $9,000,000	Phosphorus $9,000,000	50
Ingram Products Co. $1,244,000	Transportation $764,000 $480,000	80 70
E. & G. Brooke Iron Co. $175,000	Pig iron $130,450	85
United Aircraft Corp. $17,000,000	Propellers $16,800,000	75
United Aircraft Corp. $14,200,000	Engines $14,000,000	75
United Aircraft Corp. $8,400,000	Engines $8,400,000	75
Korhumel-Heffron & Preiss Steel Co. $1,182,904	Steel $1,167,904	60
Koppers Co., Inc. $617,000	Chemicals $617,000	50
Cold Metal Prod. Co. $1,287,800	Steel $1,267,185	60
Canton Drop Forging Mfg. Co. $114,306	Extrusions $114,306	75
Canton Drop Forging Mfg. Co. $250,000	Forgings $250,000	75
SKF Industries, Inc. $5,749,693	Bearings $5,749,693	85
Hoberg Paper Mills, Inc. $100,000	Paper, pulp $100,000	65
Plainville Metal Works $14,663	Hardware $14,663	80
Los Angeles Die Cast. Co. $17,554	Castings $17,554	75
Champion Paper & Fibre Co. $4,345,742	Pulp $4,336,418	65



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craft; G. C. Riegel, Caterpillar Tractor; M. L. Frey, Allis-Chalmers; Roy W. Roush, Timken-Detroit Axle; F. C. Young, Ford Motor Co.; and E. H. Stilwill, Chrysler Corp. Stilwill is 1951 chairman.

The Needs of Defense—Machine tool requirements for defense production are enormous. For example, since the opening of the Cadillac tank plant at Cleveland more than 14,000 machines, tools and miscellaneous equipment have been designed and ordered.

More than 360 miles of blue prints have been produced to date. Purchase orders totaling more than 20,000 have been issued and 1400 individual supplier firms have received orders. At the present time 3700 workers are on the job 6 days a week.

Dock Boards—In a recent address, Leland I. Doan, president of Dow Chemical Co., disclosed that last year Dow sold almost 300 tons of magnesium for dock boards. Weighing about one-fourth as much, a magnesium dock board requires less than half as much muscle power to put in place as steel. The boards are made by reinforcing a piece of magnesium plate with extruded sections of magnesium.

Doan also said that last year 2000 tons of magnesium went into the ground and into seawater installations to protect pipelines, flumes, steel piling and the like. Research has shown that magnesium anodes buried in the ground near pipelines offer cathodic protection against corrosion. Magnesium rods are also doubling and tripling the life expectancy of water heaters. About 1200 tons went into heater anodes last year.

Save on Gasoline—In case you are interested in saving gasoline, here are some driving tips furnished by Les Viland, winning driver of the recent Mobilgas Grand Canyon Economy Run.

Here is Viland's advice: (1) keep a light foot on the throttle, particularly when shifting gears and when the motor is cold. You may save up to 50 pct of your gas consumption this way, (2) drive relaxed, (3) make all driving as smooth as possible including smooth turns and slow, smooth stops with the engine acting as a brake, (4) avoid overloading the engine, (5) keep the air filter clean, battery connections tight and right oil weight in your car.

Tooling Takes Time—It can hardly be emphasized enough that tooling for defense takes time. An automotive company, recently selected to build J-47 turbo jet engines, forecasts a period of 14 months for tooling up the job. An additional 10 months will be needed to attain peak production.

An automotive tank producer estimates that 1400 subcontractors and suppliers must be tooled and ready before mass production of a new model tank can begin.

Pontiac's "Otter"—Pontiac will build a completely new amphibious cargo carrier for the Armed Services. Contract value initially is $45 million.

The tracked vehicle will be equipped with a stern propeller for water operations and will be highly mobile on snow, in mud, marshes and over rough terrain. The name is "The Otter."

Pontiac will build the automatic transmission, chassis and hull, and assemble the vehicle. About 500 suppliers will furnish parts. Approximately 2000 workers will be required. The design has been developed by General Motors Technical Laboratories working with Army experts over the last 2 years. Pontiac will also build rockets for the Army.

Contract Not Cancelled—Briggs Mfg. Co. has declared that an announcement by Emil Mazey, secretary-treasurer of UAW-CIO, that the company has cancelled its scrap metal contract with Carl Renda is untrue.

The union has filed an unfair labor practices charge against Briggs, citing the company's scrap metal contract and the beatings of six Briggs workers in 1946 and 1947. Briggs has described the union charges as "fantastic." Company officials claim the beatings have already been investigated.

THE BULL OF THE WOODS — **By J. R. Williams**

Company Applied	Product, Use Eligible	Pct. Certified
Stover Lock Nut & Machy. Corp. $299,000	Nuts, pins $299,000	70
National Gypsum Co. $476,106	Gypsum paper $476,106	50
Latrobe Electric Steel Co. $4,149,600	Steels $4,149,000	75
Pacific Piston Ring Co. $30,303	Valves $30,303	90
Amer. Brake Shoe Co. $219,442	Forgings $172,969	80
Higbie Mfg. Co. $209,240	Tubing $209,240	60
Norma-Hoffman Bearings Corp. $350,000	Bearings $350,000	75
Glass Fibers, Inc. $1,717,278	Glass wool $1,467,403	85
	$231,750	50
SKF Industries, Inc. $902,103	Bearings $886,103	85
Rhinelander Paper Co. $2,929,526	Papers $1,436,303	50
Okonite Co. $10,000	Cables $10,000	75
Eaton Mfg. Co. $848,318	Blades $848,318	75
California Ref. Co. $32,950,583	Gasoline $32,950,583	80
Coast Cent'less Grind. Co. $66,215	Grinding $48,215	90
Morris & Cumings Dredging Co., Inc. $1,100,000	Dredging $550,000	50
Commercial Const. Co., Inc. $80,138	Scrap iron $80,138	75
Commercial Metals Co. $50,000	Scrap iron $50,000	75
Jones & Laughlin $2,571,700	Transportation $720,175	70
	$1,833,525	80
National Steel Corp. $6,500,000	Transportation $6,500,000	80
Calif. Doran Heat Treat'g Co. $224,672	Fittings $151,672	75
Axelson Mfg. Co. $230,688	Assemblies $230,688	85
Kennecott Copper Corp. $7,342,910	Copper $3,987,910	85
Thompson Trailer Corp. $455,000	Radar housing $445,000	75
Rotary Electric Steel Co. $886,000	Steel $886,000	60
Aluminum Co. of America $2,749,000	Aluminum $2,749,000	75
Fuller Mfg. Co. $1,178,787	Transmissions $1,101,010	80
Jones & Laughlin $1,461,800	Scarfing $1,343,695	70
Stoner Mfg. Co. $15,993	Cartridge cases $15,993	75
Inland Equipment Co. $56,534	Rocket heads $56,534	85
Olin Industries, Inc. $490,511	Batteries $490,510	75
Aircraft Hardware Mfg. Co. $19,976	Hardware $19,976	85
Rem-Cru Titanium $450,000	Titanium ingots $450,000	75
Ingersoll Steel Div. $562,368	Steel $562,368	75
Island City Iron & Metal Co. $25,000	Scrap iron $25,000	75
Moskowitz Bros. $20,000	Scrap iron $20,000	75
Aircraft Prec. Prod's, Inc. $59,511	Parts $52,211	90
Ohio Ferro-Alloys Corp. $237,500	Ferrosilicon $237,500	85
Metalweld, Inc. $232,000	Spraying $213,000	60
Pacific Moulded Prod's Co. $5,609	Research $5,609	75
Lukens Steel Co. $142,000	Fabrication $142,000	60
Tantalum Defense Corp. $827,193	Tungsten $827,193	85
Globe Steel Tubes Co. $780,434	Tubing $780,434	75
Wells Airc. Parts Co. $5,153	Aircraft parts $4,188	85
Hydraulic Units, Inc. $32,879	Controls $32,879	85
Summers Gyroscope Co. $78,657	Instruments $70,844	85
Columbia Iron & Metal Co. $1,023,715	Scrap iron $948,715	75

* Less amount to be determined for mercury.

CMP Begins July 1

Continued from Page 101

CMP-3, preference ratings; CMP-4, warehousing; CMP-5, MRO; CMP-6, construction; CMP-7, industrial repair shops.

NPA said allocations of basic metals will not merely be "a hunting license but a cashier's check for a known supply." CMP's reasons for existence, said Manly Fleischman, NPA Administrator, are to assure defense and its programs needed materials but to see to it that their demands don't become greedy enough to disrupt the civilian economy.

Who Must File—Thus CMP will attempt to nourish a dual economy. To judge CMP effect on defense and non-defense production, NPA will require both producers for the military, AEC, and certain defense-related construction plus manufacturers of other products using basic metals to file their needs. Filing of consumer durable manufacturers is not sought. Repair shops need not file. They will be covered by a CMP regulation. However, repair and replacement parts makers must file.

Unofficially, NPA officials will admit that the eager rush to get a "fair" hunk of the production pot may push up demands to an unreal total. They wouldn't be surprised if demands ran as high as 150 pct of production and defense and supporting programs alone may call for most of output.

Although puffed-up demand may cause dislocation at first, Mr. Fleischman said quarterly scheduling of defense programs will squeeze some water out of demands. Further savings will be effected by scheduling material as and when it is needed.

Defense Production Authority's requirements committee will determine tonnage allotments to claimant agencies on the basis of need and in ratio to other agency's demands. Agencies may not issue contracts in excess of their quarterly allotments and any tonnage in excess of contracts will be deducted from the next allotment.

The excess thus will not be gravy and may discourage exorbitant demands.

"A" and "B" Producers—Borrowing from World War II, CMP programming will include "A" products and "B" products. Producers of "A" products will get production authorizations and material allotments from their customers. "B" product makers will get authorization and allotments horizontally—directly from their NPA industry division.

Mr. Fleischman said it may be true that defense needs may not take more than 20 pct of overall production. Despite this, heavy shortages of specific items in greater demand from the military will hit civilian producers hard. The military will seize alloy steels, plates, and take large quantities of bars and structurals.

It will be NPA's job to determine actual needs, authorize specific production schedules, and then juggle materials to meet those schedules. While performing this trick, NPA must serve as the protector for the civilian economy. Its success depends on just how brutal it can be in scaling inflated demands of defense and related programs down to reality.

When the torrent of requirement replies come into Washington from every steel center and manufacturing hamlet of the country, NPA men will be faced with a gigantic task of judgment. Somehow they plan to determine which products are most deserving. And as long as the war continues in its near-miss stage, manufacturers who have been snubbed will rage and new problems will arise.

Below are lists of products for which CMP filing is required and not required. Inclusion in the must-file list does not mean that a product will be given a CMP allotment. NPA wishes to get full facts and an estimate of demands to prepare for allotment of the basic metals. Some not-too pertinent products have been deleted from the following list:

Forms Required

Agricultural machinery; construction and mining machinery; oil field machinery; machine tools, metal working machinery and accessories, including welding and cutting apparatus; steam

engines, steam and hydraulic turbines; pumps and compressors; conveyors and conveying equipment; elevators and escalators; fans and blowers, industrial; industrial trucks and tractors; mechanical power transmission equipment; heat exchangers, condensers, packaging machines, centrifugals and separators; hydraulic jacks and lubricating devices; motors and generators; switch gear and electrical control apparatus; electrical welding apparatus, including electrodes and welding rods; ships and vessels; locomotives; railroad and street cars; tractors; tin cans; fabricated structural steel products; tanks, boilers and cylinders; stamped and pressed metal products; valves and fittings; anti-friction bearings; food products machinery; textile machinery; woodworking machinery; paper-making machinery; printing and publishing machinery; special industrial machinery, such as rubber, plastics, chemical, foundry, tobacco, glass, cotton, clay, cement, concrete products, etc.; aircraft and aircraft parts.

Truck trailers; metal shipping containers; screw machine products; industrial furnaces and ovens; mechanical stokers; office machines; scales and balances; commercial laundry and dry-cleaning machinery; sewing machines except household; vacuum cleaners except household; refrigeration and air-conditioning equipment, except household refrigerators and freezers and comfort air conditioning; measuring and dispensing pumps and lubrication equipment; commercial service equipment except household types; electrical wiring devices and supplies; carbon and graphite products; electrical indicating and measuring instruments; lighting fixtures; tacks, staples and cut nails and spikes; wire work products, such as wire cloth, wire chain and wire springs; safes and vaults; steel springs; bolts, nuts, rivets and other industrial fasteners; collapsible tubes; internal combustion engines; transformers; capacitors, rectifiers, induction and dielectric heating units; electrical accessory equipment for internal combustion engines; electric lamps, incandescent and fluorescent; radio, radar and television equipment, except home type; radio tubes.

Telephone and telegraph communication equipment; storage batteries; primary batteries, dry and wet; motor vehicles except passenger type; small arms; small arms ammunition; cooperage; millwork, such as door frames, windows, etc.; lasts; metal office furniture; furniture for schools, churches, etc.; partitions, lockers and shelving; window and door screens; tubes and drums; tires and inner tubes; mechanical rubber goods; leather belting; concrete products (reinforced); abrasive products; insulation, packing and gaskets; cutlery; edge tools; hand tools; files and rasps; hand saws and blades; other hardware; plumbing fixtures; oil burners; heating and cooking equipment except residential; metal doors and sash, frame, etc.; sheet metal products such as roofing, culverts, etc., except awnings and radiator enclosures; aircraft, scientific and surveying instruments; mechanical measuring and controlling instruments; pins and fasteners; fire-fighting equipment; repair and replacement parts.

Forms Not Required

Motor vehicles — passenger type; household refrigerators and freezers and comfort air conditioning; heating and cooking equipment—residential; household electrical appliances; vending and amusement machines; sewing machines—household; vacuum cleaners —household; home radio and television sets; automobile trailers (not incl. truck or house trailers); sheet metal awnings and radiator enclosures; venetian blinds; household furniture; household stamped and pressed metal products (including enameled); domestic laundry machinery; household service equipment, such as dishwashing machines, water softeners, polishing machines; motorcycles and bicycles; silver and plated ware.

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

4250 Tons, Amesbury and Newburyport, Mass., multi span steel truss bridge over Merrimack River (superstructure). Harris Structural Steel Co., N. Y., is low bidder.

2200 Tons, Hastings, Minn., Tanks for U. S. Corps of Engineers, to Graver Tank and Mfg. Co.

1900 Tons, Coatesville, Pa., addition to Lukens Steel Co. sodium hydride plant, to Belmont Iron Works.

1600 Tons, Coatesville, Pa., centralized maintenance building for Lukens Steel Co., to Bethlehem Steel Co., Bethlehem.

625 Tons, Hammond, Ind., General services administration, three warehouses to Bethlehem Steel Co.

300 Tons, State College, Pa., psysical education building at Pennsylvania State College, Baton Construction Co., low bidder.

235 Tons, Perth Amboy, N. J., fuel storage tanks for National Lead Co., to Bethlehem Steel Co., Bethlehem.

120 Tons, State College, Pa., biology laboratory for Pennsylvania State College, S. H. Everett, low bidder.

Fabricated steel inquiries this week included the following:

4500 Tons, Cook Co., Ill., Congress St. expressway from Union Station to Halsted St., Allied Structural Steel Company, low bidder.

2600 Tons, Philadelphia, tank shop for Budd Co., pending.

1600 Tons, Redline, Pa., machine shop for Budd Co., pending.

900 Tons, Towanda, Pa., building for Sylvania Electric Products, Inc., pending.

415 Tons, Sweet Water County, Wyoming, bridge project S-264/6/.

300 Tons, Eddystone, Pa., furnace building for General Steel Casting Corp., bids due Apr. 20.

250 Tons, Chambersburg, Pa., foundry building for Chambersburg Engineering Co., bids due Apr. 20.

100 Tons, Easthampton, Mass., single span steel girder bridge and bituminous macadam over Manhan River near Mill St. Cyril B. Raymond, Greenfield, Mass., district engineer. Completion date June 27, 1952.

Reinforcing bar awards this week included the following:

600 Tons, Chicago, Ill., apartment bldg. Walton and Seneca Sts., to Olney J. Dean Co.

360 Tons, Amesbury and Newburyport, Mass., multi span truss bridge over Merrimack River (superstructure). Harris Structural Steel Co., N. Y., low bidder.

310 Tons, Chicago, Ill., city sewer contract 1-E, to Joseph T. Ryerson and Sons.

250 Tons, Amesbury and Newburyport, substructure of bridge over Merrimack River. Merritt, Chapman and Scott, New York, low bidder.

Reinforcing bar inquiries this week included the following:

1300 Tons, Chicago, Ill., Congress Street improvements from Canal to Desplaines St., Thomas McQueen Co., low bidder.

350 Tons, Chicago, Ill., apt. bldg., 70th place and South Shore Drive, Frank Schmidt Construction Co., contractor.

350 Tons, Chicago, Ill., machinery foundation for Ford Motor Co.

100 Tons, Boston, Mass. Repairs to viaduct at Commonwealth Pier (state maintenance project), between Summer St. and Commonwealth Pier No. 5. This includes provision for new expansion joints in roadway and sidewalks, putting the expansion joints on girders in good working order, repairing and altering some parts of the drainage system.

publications

Continued from Page 34

the chemical composition of the different types, are also included. *Cooper Alloy Foundry Co.*

For free copy insert No. 8 on postcard p. 35

Zone-Marking Units

Marking safety lanes, aisles, restricted areas and parking lots in and around industrial plants and warehouses can be done quickly, easily and economically with the new Kelly-Creswell Model C industrial stripers detailed in a new 6-p. folder and data sheets. Wheel-mounted for easy one-man operation, the unit is shown to work with equal efficiency on any smooth or rough surface, inside or outside plant buildings. Guide marks and heavy edges are eliminated, and saving up to 20 pct in striping materials are claimed. *Kelly-Creswell Co.*

For free copy insert No. 9 on postcard p. 35

Chart on Belt Care

An exclusive poster chart on the care and maintenance of power-driven belts presents through simple schematic pictures and words the steps to be taken in the care, maintenance and treatment of all power-driven belts. Measuring 13½ x 21 in., the chart tells how proper care and maintenance increase production, conserve man-hours and manpower, reduce material replacement, and deliver maximum ratio of power to production. *Cling-Surface Co.*

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Fabrication Contractor

An informative new 4-p. folder describes A. L. Smith's facilities and specialized abilities in metal fabrication and the assembly of electrical components. The bulletin illustrates how this company is currently set up to produce a wide range of fabricated products, with or without electrical wiring, either as prime- or sub-contractors. *A. L. Smith Iron Co.*

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Airless Blast Cleaning

The Rotoblast "turn-style table," for airless blast cleaning of castings, is described in a new 4-p. illustrated bulletin which tells and

Mono-Cushion

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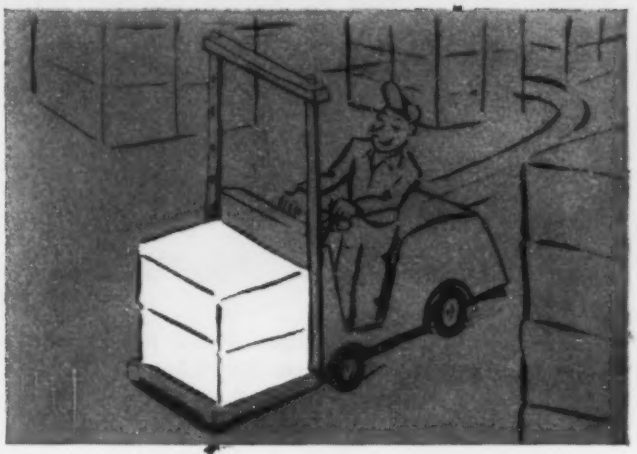

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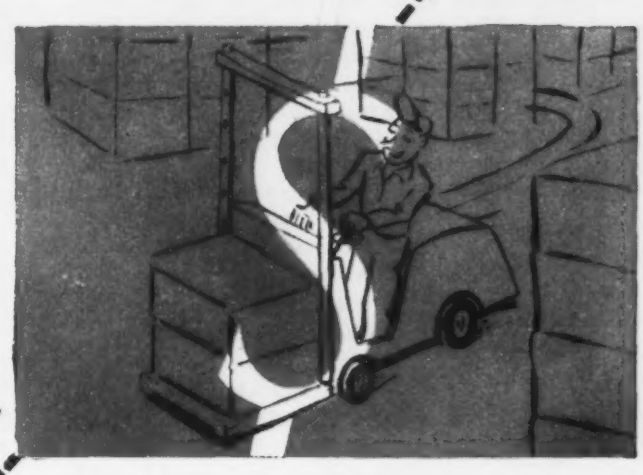

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shows how the machine saves labor and dollars by cleaning in one section while the other section is being loaded. Actual savings made by users, how the machine works, protective features for operators, crane loading possibilities; variations, and engineering specifications are given in the folder. *Pangborn Corp.*

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Punch Presses

A new, condensed 4-p. catalog describes and illustrates all L & J open back, inclinable punch presses, made in 12 models that range in size from 6- to 80-ton capacities, with the 4 larger sizes also available in back geared types. Complete, detailed specifications are given for every model and include fully dimensioned diagrams of the lower rams. *L & J Press Corp.*

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Trucking Case History

The first 4-p. brochure of a series of case histories on individual GMC trucks and fleets goes into the operation of an HDC-745 diesel tractor which hauls beverages over all types of roads with 3 to 6 pct grades at speeds of 50 to 55 mph. The operation analysis shows that the big diesel covered 128,684 miles in 11 months with average payload weight of 42,234 lb, getting 5½ miles per gal of fuel oil and 1000 miles per quart of lubricating oil. *Truck & Coach Div., General Motors Corp.*

For free copy insert No. 14 on postcard p. 35

Carbide Drills

A new 12-p. catalog supplement illustrates and gives complete price and dimensional data on solid carbide drills and carbide tipped drills in a variety of spirals. Also included are "super hard" drills for hardened steel and core drills. The booklet brings together drill information along with instructions on set-up, feeds and speeds, lubricants and regrinding. Production shop men, tool room men and buyers will find it useful. *Super Tool Co.*

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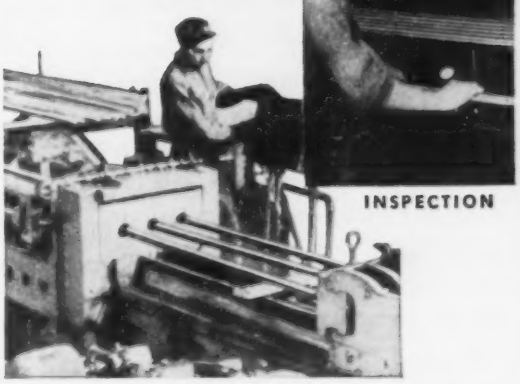
Resume Your Reading on Page 35

TESTING



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PLANTS: HARVEY, ILL. • BUFFALO, N. Y. • MANSFIELD, MASS.

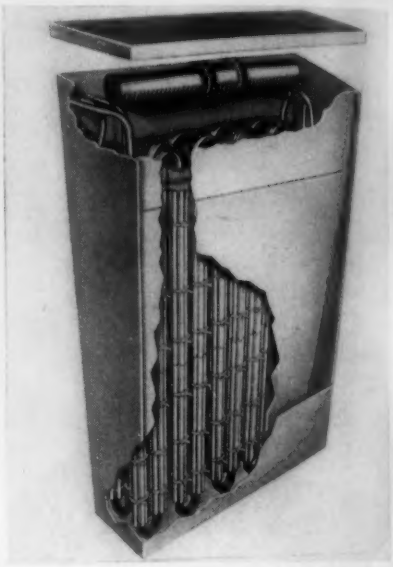
SALES OFFICES IN ALL PRINCIPAL CITIES

SINCE 1891

production ideas

Continued from Page 38

the atmosphere while being cooled. Only an impeller pump is required to lift the oil to the top of the oil cooler. The oil is confined to the cooling surface in a film and flows by gravity over the surface and back to the machine tool's tank.



The unit is easy to clean and service and will cool all machine tool oils within their range of viscosities so that different oils may be selected if desired without affecting the operation of the cooler. Size range is from 1½ to 7½ tons. *B.S. Williams Co., Inc.*

For more data insert No. 29 on postcard, p. 35.

V-Type Gravity Conveyer

Specially designed to cradle shell cases for safer, speedier handling.

A specialized war-time adaptation of gravity roller conveyers arranges conveyer rollers to form a wide V to cradle shell cases and projectiles. The V-type gravity conveyer is made for quick shipment in standard 10-ft sections and 90° curves. Projectiles can be taken off the conveyer by rolling them

RE-BILT*

by

CHICAGO FREIGHT CAR

TO MAKE

MORE PROFIT FOR YOU!

MANY TYPES NOW IN CFC's SHOPS FOR DELIVERY IN THE NEAR FUTURE

There are two ways that Chicago Freight Car can help you get delivery on rolling stock within a relatively short time.

1. Chicago Freight Car has an inventory of a wide variety of cars which are being reconditioned—some are ready for immediate delivery, others on hand that can be repaired to your specification.

2. Chicago Freight Car's three shops are manned by skilled workers and are fully equipped to take your old cars which are in need of repair or rebuilding and turn them into revenue-producing equipment. This type of work may be handled on a job or contract basis.

The rebuilding and repairing of cars in Chicago Freight Car shops is backed by over 20 years of specialized engineering know-how and fabricating experience.

Shown above are typical cars which have gone through Chicago Freight Car's shops—each is an example of sound reconstruction that gives dependable performance.

Specifications on reconditioned cars which are available will be sent upon request.

Estimates on repairing your old cars will be given without obligation—simply write.

CHICAGO FREIGHT CAR... *and parts company*

CHICAGO, ILL. AUBURN, WASH. PUEBLO, COLO.

MAIN OFFICE: 228 North La Salle Street, Chicago 1, Illinois

*RE-BILT cars by Chicago Freight Car have been repaired, thoroughly reconditioned, converted or AAR Rebuilt to meet your requirements.

production ideas

Continued

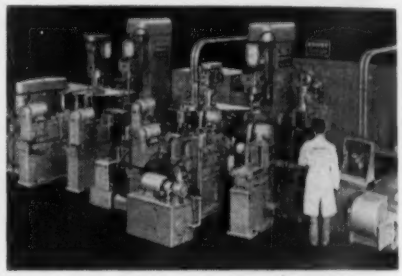
over the guard rail, eliminating lifting operations. Rollers are easily snapped out and reversed should they become worn in one area. Conveyer sections may also be used to convey non-military cylindrical-shaped products without alteration. They are available in wood and steel types. *Lamson Corp.*

For more data insert No. 30 on postcard, p. 35.

Special Machine Tool

Designed to mill, drill, bore, ream, chamfer and tap clutch housings.

Only two unskilled operators are required to operate a new special machine tool that is said to machine 94 clutch housings per hr at 100 pct efficiency. One operator loads and presses the starting but-



ton, the other unloads the completed housing. The machine is a Transfermatic. Palletized work fixtures hold the housings during the transferring from one end of the machine to the other. An integral conveyer automatically returns the pallets from the unloading to the loading station. The work is done at nine stations. Chips are automatically removed by a built-in conveyer. Standard Cross units facilitate maintenance and provide flexibility for part design changes. *Cross Co.*

For more data insert No. 31 on postcard, p. 35.

Beta Ray Gage

Records variations in weight per unit area of moving sheet material.

Outstanding advantages of a new beta ray gage are its ability to measure accurately and continuously to a few millionths of an inch without contacting the material being gaged; to operate continuously without any standardization or recalibration by plant personnel; its insensitivity to steel composition

DUCTILE IRON

A Revolutionary Metallurgical Development

DUCTILE IRON is a cast ferrous product which combines the *process advantages* of cast iron with many of the *product advantages* of cast steel.

No longer in the pilot-plant stage, this new material is now produced and sold on the basis of specifications. Not only are its individual properties exceptional, but no other common engineering material provides such a combination of excellent castability and fluidity, with high strength, toughness, wear resistance, and machinability.

Actually, "ductile iron" denotes not a *single* product, but rather a family of ferrous materials characterized by graphite in the form of spheroids . . . a form controlled, in a broad sense, by small amounts of magnesium. Presence of spheroidal rather than flake graphite gives this new product a ductility that is unique among gray cast irons.

Four important types of ductile iron now being produced commercially are tabulated below.

REPRESENTATIVE MECHANICAL PROPERTIES OF COMMERCIAL HEATS OF DUCTILE IRON

	Grade	Tensile strength, psi	Yield strength, psi	Elongation per cent	BHN	Usual condition
A	90-65-02	95/105000	70/75000	2.5/5.5	225/265	As-cast
B	80-60-05	85/95000	65/70000	5.5/10.0	195/225	As-cast
C	60-45-15	65/75000	50/60000	17.0/23.0	140/180	Annealed
D	80-60-00	85/95000	65/75000	1.0/3.0	230/290	As-cast

A Pearlitic in structure. Provides good mechanical wear resistance.

B Pearlitic-ferritic in structure. Provides strength and toughness combined.

C A fully ferritic structure usually obtained by short anneal of either (A) or (B). Provides optimum machinability and maximum toughness.

D Higher phosphorous content than preceding grades, also higher manganese. Provides high strength and stiffness, but only moderate impact strength.

SOME UNIQUE PROPERTIES OF DUCTILE IRON

1. Its elastic modulus, about 25,000,000 psi, is virtually unaffected by composition or thickness . . .

2. It can provide a chilled, carbidic, abrasion-resistant surface supported by a tough ductile core. No other single material can combine these properties . . . its only counterpart being a tough material coated with a hard welded overlay.

3. As-cast ductile iron of 93,000 psi tensile strength has the same machinability rating as gray iron with a strength of 45,000 psi.

4. Annealed ductile iron can be machined at a rate 2 to 3 times that of good quality gray iron.

5. It can be satisfactorily welded.

APPLICATIONS

Automotive, agricultural implement, railroad and allied industries apply ductile iron, as-cast and heat treated, in components too numerous to detail.

Machinery, machine tools, crankshafts, pumps, compressors, valves and heavy industrial equipment such as rolls and rolling mill housings, utilize its high strength and rigidity.

In scores of engine, furnace and other parts serving at elevated temperatures, it provides oxidation and growth resistance heretofore unavailable in high carbon castings.

Other applications include paper, textile and electrical machinery, marine equipment, and pipe.

AVAILABILITY

Send us details of your prospective uses, so that we may offer a list of sources from some 100 authorized foundries now producing ductile cast iron under patent licenses. Request a list of available publications on ductile iron . . . mail the coupon now.

EMBLEM OF INCO SERVICE
TRADE MARK

The International Nickel Company, Inc.
Dept. IA, 67 Wall Street
New York 5, N. Y.
Please send me a list of publications on:

DUCTILE IRON

Name _____ Title _____

Company _____

Address _____

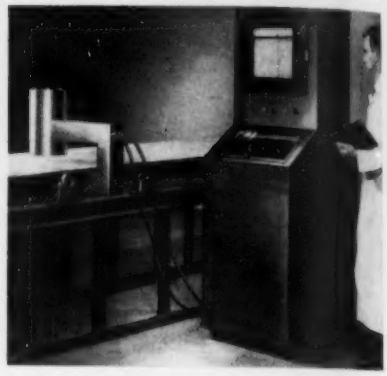
City _____ State _____

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5. N. Y.

production ideas

Continued

changes; and its high degree of stability under adverse plant conditions including temperature variations, dirt, moisture, shock and vibration. The gage utilizes radioactive materials produced under the direction of the U. S. Atomic Energy Commission. Basic components of the gage are a source of beta radiation, a radiation detector,



and a recording device. Material being measured is run through a gap between the source and detector, preventing a portion of the source radiation from reaching the detector in proportion to the weight per area of material. Operation consists of merely changing settings on two dials recessed in the console when manufacturing thickness specifications are changed. The gage standardizes automatically for all causes of drift or erroneous readings. A scanning mechanism permits readings across the width of a sheet. *Industrial Nucleonics Corp.*

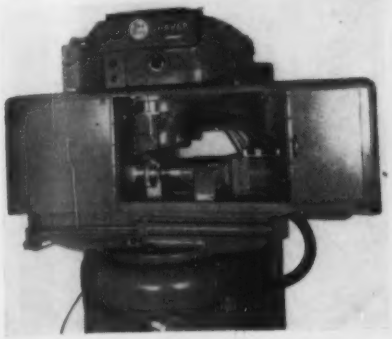
For more data insert No. 32 on postcard, p. 35.

Gear Loader

Increases production rate on diagonal gear shaving machines.

Semi-automatic loading applicable to National Broach's diagonal gear shaving machines to increase the production rate of shaved gears is accomplished by equipping the machine with an air-actuated tailstock, automatic splash guard and a prelocator and stripper that supports the work until it is engaged by the advance of the tailstock. After the operator lays the work gear on the prelocator, he pushes the *start* button. This starts the

cycle that follows automatically. The splash doors close, the tailstock advances to engage the work, the coolant flow starts and shaving begins. At the end of the shaving



cycle the cutter stops, the coolant flow stops, the tailstock retracts and the splash doors open—all automatically. *National Broach & Machine Co.*

For more data insert No. 33 on postcard, p. 35.

Grease Lubricator

Functions in coldest weather with all standard lubricating grease.

A force feed grease lubricator, type F, has no valves, springs, or packings and is said to work against the highest pressures. The

quantity of grease to be delivered is accurately controlled regardless of pressure. Reservoir capacities of 4, 8, and 16 qt are available with from 1 to 24 outlets along with rotary or ratchet drives. *McCord Corp.*

For more data insert No. 34 on postcard, p. 35.

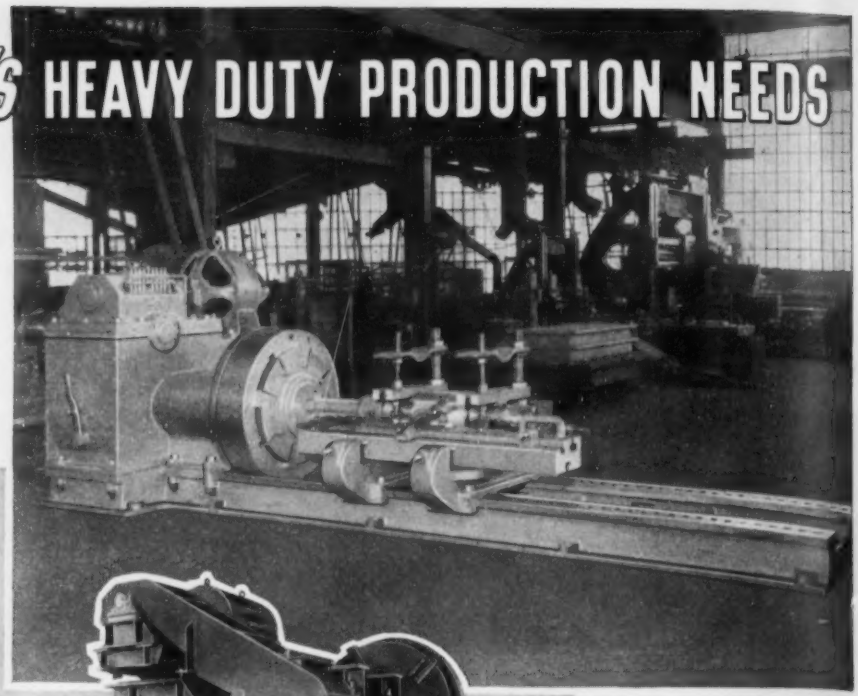
High Speed Turret Lathes

1-in. size for heavy cutting at high speeds; has six spindle speeds.

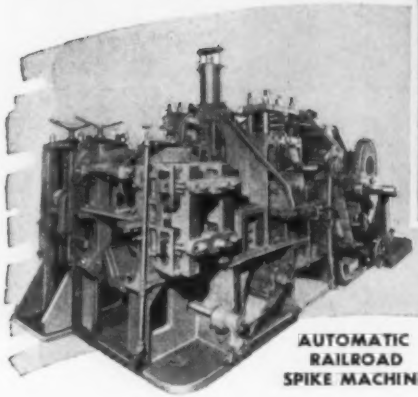
In the Murad line of turret lathes a new low cost high speed model is a ram type and manufactured to 0.0005-in. tolerances on all critical dimensions. Controls are central-

Turn to Page 130

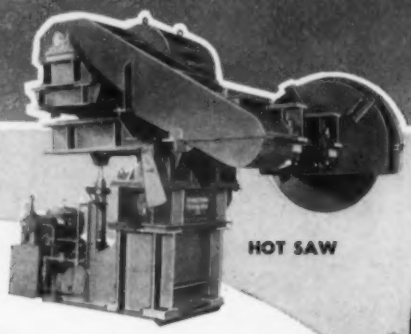
SERVING *TODAY'S* HEAVY DUTY PRODUCTION NEEDS



18" WORM DRIVE ROLL LATHE

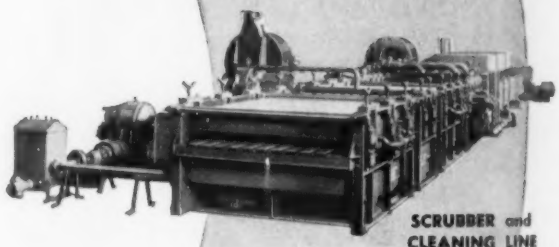


AUTOMATIC RAILROAD SPIKE MACHINE

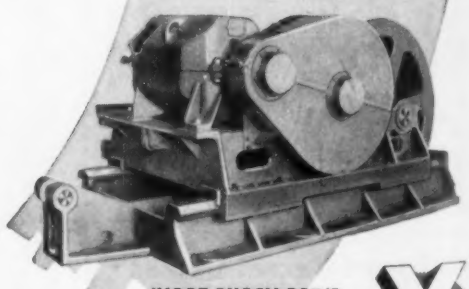


HOT SAW

WELDED GEAR REDUCER



SCRUBBER and CLEANING LINE



INGOT BUGGY DRIVE

Check this List for the Products You Need

PARALLOY ROLLS (Pinch, Coiler, Tension, Steel Mill)
HYDRAULIC SLAB AND BILLET PILERS
STRIP AND SHEET OILING EQUIPMENT
SHEET SCRUBBER AND CLEANING LINES
HOT SAWS—ROCKING AND SLIDE TYPES
HOT BEDS—COOLING BEDS—TRANSFERS
BILLET EJECTORS—PINCH ROLL STANDS
SLITTERS—SPECIAL SHEARS AND GAUGES
TILTING TABLES—Traveling and Lifting Tables
Continuous PICKLING Lines—ROLLER LEVELERS
FURNACE Charging Equipment—Furnace Pushers
Strip Steel COILERS and REELS—SCRAP BALLERS
RAILROAD Spike Forming Machines—ROLL LATHES
Sheet GALVANIZING Lines—Wire Patenting Frames
Stretcher Levelers—Angle and Shape Straighteners
Rolling Mill Tables—Gear and Individual Motor Types
DUCTILE CASTINGS (80,000 PSI.)

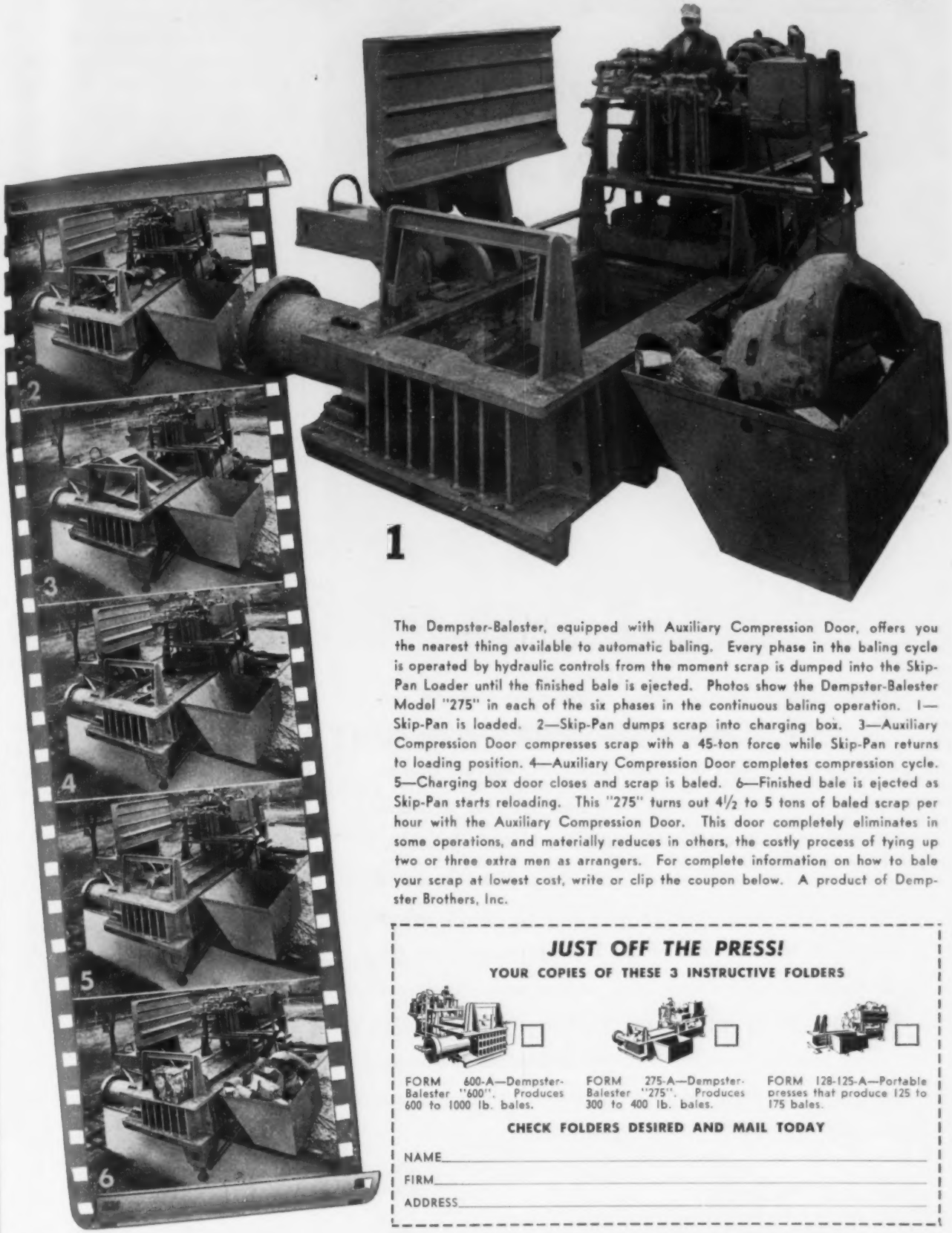
Machinery Built to Customer's Design and Detail Drawings

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

here's the nearest thing to Automatic Baling!



The Dempster-Balester, equipped with Auxiliary Compression Door, offers you the nearest thing available to automatic baling. Every phase in the baling cycle is operated by hydraulic controls from the moment scrap is dumped into the Skip-Pan Loader until the finished bale is ejected. Photos show the Dempster-Balester Model "275" in each of the six phases in the continuous baling operation. 1—Skip-Pan is loaded. 2—Skip-Pan dumps scrap into charging box. 3—Auxiliary Compression Door compresses scrap with a 45-ton force while Skip-Pan returns to loading position. 4—Auxiliary Compression Door completes compression cycle. 5—Charging box door closes and scrap is baled. 6—Finished bale is ejected as Skip-Pan starts reloading. This "275" turns out 4½ to 5 tons of baled scrap per hour with the Auxiliary Compression Door. This door completely eliminates in some operations, and materially reduces in others, the costly process of tying up two or three extra men as arrangers. For complete information on how to bale your scrap at lowest cost, write or clip the coupon below. A product of Dempster Brothers, Inc.

JUST OFF THE PRESS!

YOUR COPIES OF THESE 3 INSTRUCTIVE FOLDERS

☐

FORM 600-A—Dempster-Balester "600". Produces 600 to 1000 lb. bales.

☐

FORM 275-A—Dempster-Balester "275". Produces 300 to 400 lb. bales.

☐

FORM 128-125-A—Portable presses that produce 125 to 175 bales.

CHECK FOLDERS DESIRED AND MAIL TODAY

NAME_____

FIRM_____

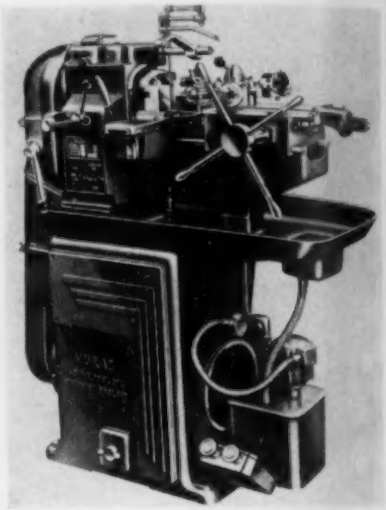
ADDRESS_____

DEMPSTER BROTHERS, 341 Dempster Bldg., Knoxville 17, Tennessee

production ideas

Continued from Page 127

ized for quick and easy operation. Two pedal-operated switches control two motor speeds in 1:4 ratio. Six spindle speeds are available, forward and reverse. The bar feed



is gravity operated and fully guarded. Cutting lubricant is provided by a separate motor driven pump unit. Automatic oiling of the machine is by pump actuated by a swinging stop lever. *British Industries Corp.*

For more data insert No. 35 on postcard, p. 35.

Improved Kal-Truc

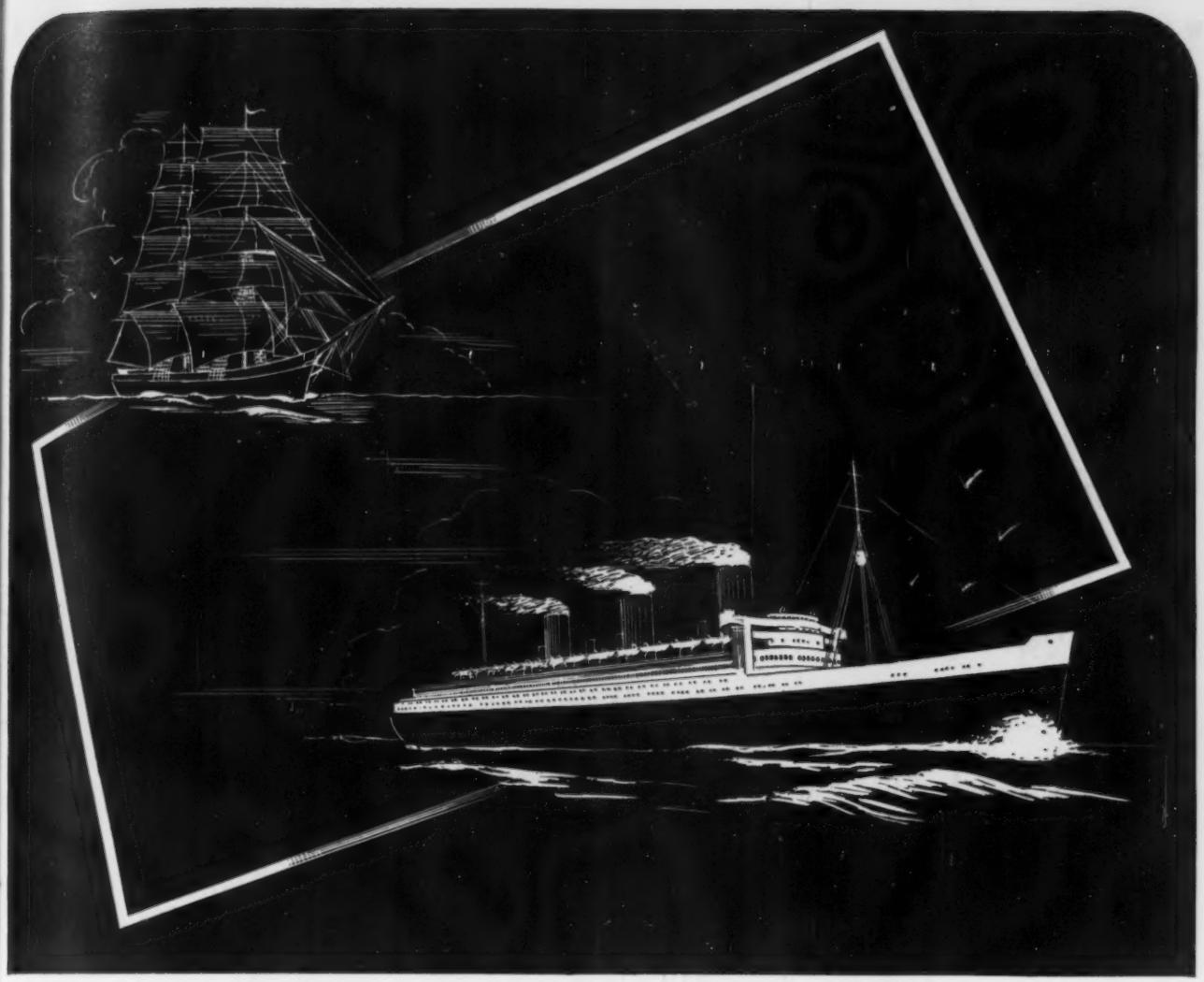
Has dump control on front end gate.

A control door allows easier pouring into small or narrow openings and is also desirable for dis-

charging partial loads. The dump control is manually operated and may be opened or closed at any time. A front end gate embodying this new feature is available for installation on trucks already in service. *Kalamazoo Mfg. Co.*

For more data insert No. 36 on postcard, p. 35.

Turn to Page 134



SINCE 1850

THE MERCHANT MARINE

in its advance from full rigged wooden ships to modern floating palaces of steel, has been paced by the production and transportation of the necessary ores from which have been made the metals that have made its development possible.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY
UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

"I want to see Americans save . . ."

JOHN L. COLLYER
President, The B. F. Goodrich Company

"I want to see Americans save for their own personal security, and I want to see them, as stockholders in our government, urge economy in all phases of our national life in order to provide national security against aggression."

By their rapidly mounting participation in the Payroll Savings Plan, Americans *are* saving for their personal security, fighting the menace of inflation and making a major contribution to America's defense against aggression. In Mr. Collyer's own company 80% of the 38,000 employees throughout the company have already enrolled in the Plan, with two large divisions still to report.

As Chairman of the Ohio Payroll Savings Advisory Committee, Mr. Collyer knows what is being accomplished by leaders of industry, top management and labor in their joint effort to step up the Payroll Savings Plan. A few recent figures should be interesting to those not so familiar with the national picture:

• In the steel industry campaign, Carnegie-Illinois Steel Corporation (now U. S. Steel Company), recently raised its payroll participation from 18% of 100,000 employees to 77% . . . Columbia Steel Company of California went from 7.9% to 85.2% . . . American Bridge Company signed 92.8% of the workers in the large Ambridge plant . . . 87% of Allegheny-Ludlum Steel Corporation's 14,000 employees are now on the Payroll Savings Plan . . . Crucible Steel Company of America, reinstating its plan, signed up 65% of its 14,500 employees.

• In the aviation industry, Hughes Aircraft Company went from 36% to 76%; Boeing Aircraft enrolled 10,000 new names before Christmas.

Some dollars and cents figures? In the last quarter of 1950, sales of $25 E Bonds—the denomination so popular with payroll savers—increased 2.5% by 245,000 bonds more—over the last quarter of 1949.

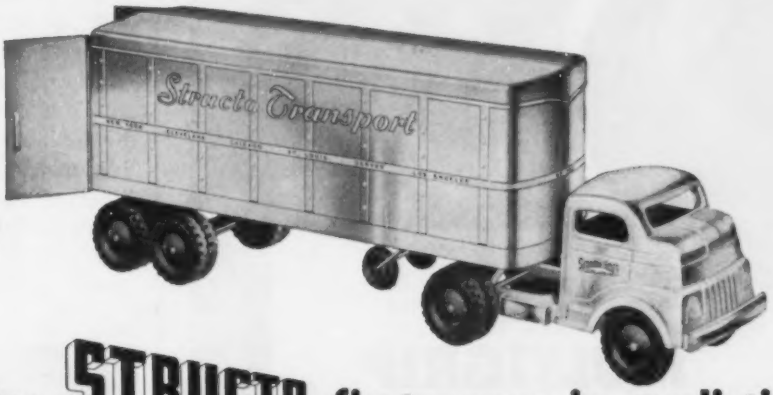
If you do not have The Plan That Protects the personal security of your employees, the national economy and our country's defense, phone, write or wire to U. S. Treasury Department, Savings Bonds Division, Washington Building, Washington, D. C. Your State Director is ready to help you install a Payroll Savings Plan or step-up your employee participation.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

THE IRON AGE

KUX

FIRST NAME IN DIE CASTING MACHINES

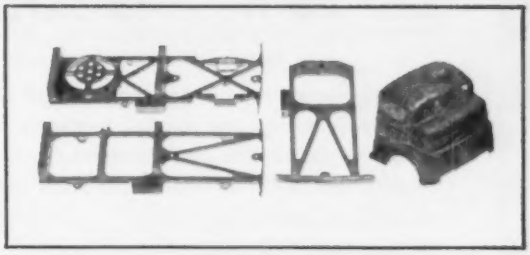


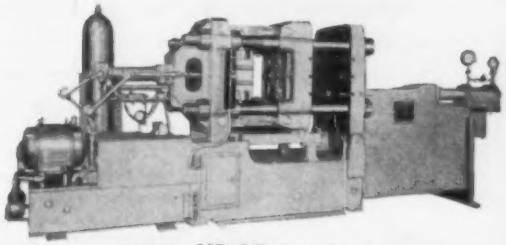
used by STRUCTO first name in realistic toys

UNGENTLE YOUNG HANDS put famous Structo trucks, trailers and steam-shovels through their "live-action" paces again and again. Toys have to be tough to take that. Structo *is* tough. Employing KUX die casting machines, Structo gets lightweight, structural castings of extra-ruggedness . . . to build toys that last a child-time of pleasure!

Is YOUR PRODUCT conditioned for the treatment it has to take? Quality die castings often make a tremendous difference in costs and saleability. KUX, first name in die casting machines, can make that difference for You!

Write for illustrated catalog showing complete line of KUX Die Casting Machines.





MODEL **HP-35** ILLUSTRATED

Hydraulically operated die casting machine for production of aluminum castings.

KUX MACHINE COMPANY • 3932 W. HARRISON STREET • CHICAGO 24, ILLINOIS

KUX

FIRST NAME IN DIE CASTING MACHINES
SELECTED BY FIRST NAMES IN INDUSTRY

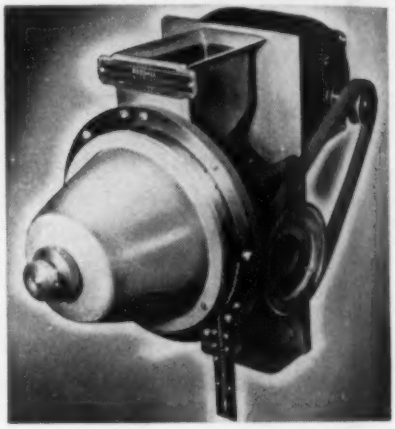
production ideas

Continued from Page 130

Automatic Rivet Feed

Feeds small rivets, eyelets, crews and other similar parts.

An automatic rivet feed, Model 300, is entirely self-contained and is driven by 1/12 hp single phase motor. Parts can be fed at high rate of feed, with shoulders or heads in either position. The feeding mechanism is on the rotating selector ring principle, parts oriented in the proper position entering the chute and thence to the work station. Parts not in the



proper position, recirculate until they enter the chute in the proper position. The unit is adapted to feeding parts to presses, power screwdrivers, riveting operations and other special machines and fixtures. *Feedall Machine & Engineering Co.*

For more data insert No. 37 on postcard, p. 35.

Self-Lubricating Pliers

Feature wide opening jaws and maximum strength around the rivets.

New models in the Lubring line of self-lubricating pliers are a 6-in. diagonal cutting pliers No. 241 and a 6-in. diagonal cutting pliers No. 242SW with a wire stripping hole in the blade and sleeve grooves or wire twisters with W-shaped stripping notches on back of the head. A ring of porous, oil-bearing iron that rides in the joint, gives up oil, lubricating the pliers as they are used. *Utica Drop Forge & Tool Corp.*

For more data insert No. 38 on postcard, p. 35.

Resume Your Reading on Page 39

IRON AGE *markets and prices*

market briefs and bulletins

DO-97—Revision of DO-97, long awaited, came this week. Originally intended to help plants with maintenance and repair, DO-97 fell under its own weight. The priority can no longer be used for chemicals, nylon fiber or yarns, packaging materials, paints, paper, photo film, rails or accessories, rubber tires and tubes, and any of the items in List A of M-47. The revision was effective Apr. 16. Application of DO-97 to orders falling in these categories and already placed, is cancelled.

relief asked—Tool steel prices probably will go up because of the rising cost of tungsten ore. A ferrotungsten producer has discontinued price quotations on this material pending establishment of a price ceiling by OPS. Last quoted price was $3.25 per lb. Ceiling price probably will be around $4.10 per lb. In anticipation of this tool steel producers have asked OPS for permission to raise prices to compensate. Tungsten ore price has risen in last year from $20-24 per net ton unit to around $65, where the government is trying to stabilize it.

not 13.2 pct but 131 pct—Earnings of Wheeling Steel Corp. in 1950 increased 131 pct over 1949—not the 13.2 pct increase listed by THE IRON AGE in its Apr. 12, 1951 issue, p. 126. A limited quantity of reprints of THE IRON AGE financial analysis of the steel industry are available on request.

supply lines—Canadian purchasing agents face difficulties in filling non-defense needs as armaments priorities grow. Ottawa believes steel production will be completely scheduled by the third quarter. Further restrictions on steel use are in the works. Eventually permits may be required for use of steel in any type of construction.

strapping—Growing shortage of steel strapping is tying up shipping and some production. Rapid growth of basic industries and government prime contractors accounts for the unusual demand. Industry spokesmen want the government to tell them who gets what—but fast.

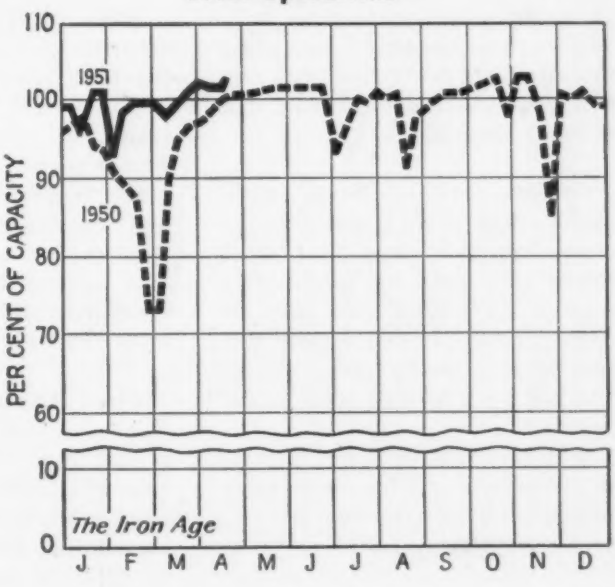
blown in—Carrie No. 1 blast furnace of U. S. Steel Co. was blown in on Apr. 11. It was shut down on Mar. 4 for relining.

probe scrap prices—Government price investigators moved into principal scrap-trading areas this week to study complaints of "widespread violations" of ceiling prices. Agents from Office of Price Stabilization headquarters in Washington are aiding regional investigators in what OPS calls a "concentrated check." Findings will be reported to Washington for action.

furnace coming in—The Chester Furnace is reportedly scheduled to be blown in June 1. The furnace has been ready for some time but lack of raw material supplies has held up the works. There is still one hitch—shipping space is tight for the ore which is to come from the Isle of Pines, just off Cuba.

aluminum foil—A new $4 million aluminum foil plant has been opened in Jackson, Tenn., by Aluminum Foil, Inc., subsidiary of the Swiss Aluminum Co., Ltd. Two lines of 4-high Lewis mills, one 36-in. and the other 44-in., special slitting machines, and annealing furnaces have been installed.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Apr. 8	99.0	106.0*	94.0*	100.0	104.0	104.0	97.5*	103.0*	98.0	97.0	92.0	92.4	112.6	102.5
Apr. 15	99.0	106.0	96.0	100.0	107.0	104.0	97.0	106.0	100.0	102.5	94.0	92.4	98.0	103.0

* Revised.
** Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.

nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	Apr. 11	Apr. 12	Apr. 13	Apr. 14	Apr. 16	Apr. 17
Copper, electro, Conn....	24.50	24.50	24.20	24.20	24.50	24.50
Copper, Lake delivered..	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York....	$1.505	$1.47	$1.47	....	$1.47	$1.47*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.
*Tentative.

by R.Hatschek

Price Proposals—Proposals to bring copper and brass scrap prices into line with ceilings on primary metal were nearing final consideration at the Office of Price Stabilization last week. Nothing official had been issued at press time but Arthur F. Morling, OPS metals consultant, admitted to industry representatives at a Washington meeting that scrap prices should be "rolled back into a normal relationship" with the primary metals.

Compromise? — Scrap metal dealers feel that it would be almost impossible to roll back prices into a decent relationship with primary metals as they are pegged today. It would mean cutting copper scrap prices 6¢ to 10¢ per lb, zinc and lead almost as much.

A compromise is believed to be in the offing—rolling back scrap prices part of the way and increasing primary metal prices to meet them. Prices suggested were 28¢ per lb for copper and 20¢ for lead. Zinc would also be boosted. In this way, the scrap traders point out, their business would not have the bottom completely kicked out.

World Position—An increase to 28¢ per lb has already been suggested as a means of alleviating the copper shortage in this country. This price would indeed put the United States in a more favorable position to compete with other countries for existing world copper supplies.

Scrap Mart Unchanged—Apart from all the conjecture that is going on regarding possible Washington action, the scrap metals trade is continuing unabated. Prices remain far out of line, demand stays at a fantastic level and supplies are scanty as ever. Dealers are selling material as fast as possible to avoid being caught with high-priced scrap when the OPS order finally comes.

Alcoa Expansion—At the moment, Aluminum Co. of America is still undecided as to the location of their new smelter. The Pacific Northwest is preferred but everything hinges on the best source of power—Alcoa preferring not to build its own power plant. It is expected that the final decision will be made very shortly.

Harvey Machine Co. is reported to have made agreements on Bonneville power for their aluminum reduction plant to be located near Kalispell, Mont.

Copper Statistics—Figures reported by the Copper Institute showed increased production and shipments for March. Domestic crude copper production totaled 84,644 tons from primary sources and 6027 tons from secondary, while refined production jumped to 112,933 tons for the month. Deliveries added up to 116,793 tons, bringing stocks down to 55,609 tons.

CMP Set for July 1—National Production Authority announced last week that a controlled materials plan for copper, aluminum and steel would go into effect on July 1 (see p. 101 for complete story). The plan still leaves room for plenty of procurement trouble in civilian items.

In the case of aluminum, the open end will be very short (see THE IRON AGE, Apr. 5, p. 117) and it will require intelligent administration to work properly. It should eliminate duplications where a firm procures aluminum with a DO and then subcontracts some of the work without passing on the metal. It should also force other companies, who have been stockpiling aluminum, to use stocks before obtaining any more for future use, defense or otherwise.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks	....	50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheet	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.84	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$216-$220
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.47
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.25
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	34.50-36.25
0.60 copper, max.	34.25-36.00
Piston alloys (No. 122 type)	31.00-32.50
No. 12 alum. (No. 2 grade)	30.25-31.25
108 alloy	31.50-32.00
195 alloy	32.50-33.00
13 alloy	34.50-36.00
ASX-679	31.50-33.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95.97½%	32.50-33.50
Grade 2—92-95%	31.50-32.50
Grade 3—90-92%	30.50-31.50
Grade 4—85-90%	29.50-30.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22⅛
Yellow Brass	20½	18⅝
Red brass	21½	20⅜
Comm. bronze	21¾	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.50
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	19.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	28.00-29.00
No. 2 copper wire	26.00-26.00
Light copper	23.50-24.50
No. 1 composition	25.00-25.50
No. 1 comp. turnings	24.50-25.00
Rolled brass	19.00
Brass pipe	20.50
Radiators	19.00-19.50
Heavy yellow brass	19.00-19.50
Aluminum	
Mixed old cast	21 —22
Mixed new clips	24 —25
Mixed turnings, dry	21 —21½
Pots and Pans	21 —22
Low copper	25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	25½—26½
No. 2 heavy copper and wire	24 —25
Light copper	22 —22½
New type shell cuttings	22 —22½
Auto radiators (unsweated)	17½—18
No. 1 composition	22 —23
No. 1 composition turnings	21 —22
Clean red car boxes	19 —19½
Cocks and faucets	19 —19½
Mixed heavy yellow brass	16½—17
Old rolled brass	18½—19
Brass pipe	20 —20½
New soft brass clippings	20 —21
Brass rod ends	19½
No. 1 brass rod turnings	19

Aluminum

Alum. pistons and struts	13 —13½
Aluminum crankcases	16½—17
2S aluminum clippings	20½—21
Old sheet and utensils	16½—17
Borings and turnings	12½—13
Misc. cast aluminum	16½—17
Dural clips (24S)	16½—17

Zinc

New Zinc clippings	17 —18
Old Zinc	12½—13
Zinc routings	8½— 9
Old die cast scrap	8 — 8½

Nickel and Monel

Pure nickel clippings	90 —100
Clean nickel turnings	80 —90
Nickel anodes	90 —100
Nickel rod ends	90 —100
New Monel clippings	30 —35
Clean Monel turnings	20 —25
Old sheet Monel	25 —30
Inconel clippings	30 —35
Nickel silver clippings, mixed	16 —18
Nickel silver turnings, mixed	15 —16

Lead

Soft scrap, lead	16½—16¾
Battery plates (dry)	9½—10

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	110 —120
No. 1 pewter	80 —85
No. 1 auto babbitt	75 —80
Mixed common babbitt	16 —17
Solder joints	23 —24
Siphon tops	75 —80
Small foundry type	18¾—19
Monotype	17½—18
Lino. and stereotype	17
Electrotype	15¾—16
Hand picked type shells	11½—11¾
Lino. and stereo. dross	9½—10
Electro. dross	7½— 8

SCRAP *iron and steel*

markets prices trends

Chicago scrap moves out . . . Birmingham helped by Florida scrap . . . Overall stocks dip . . . Earmark plant scrap.

Nearly everyone in the scrap field can find a valid complaint in this tight market where mills are holding a bulldog grip to high operating rates right down to the tape. Meanwhile, the scarcity continues to gnaw on inventory.

Allocations are a bigger factor in today's market, working against the uneven distribution resulting from heavy pre-rollback shipping. Chicago dealers are watching their scrap move to out-of-district mills. They chance rejections and extra freight charges and say they lose money when forced to prepare allocations of heavy melting. The same stuff can be prepared into more profitable foundry grades.

Pittsburgh reports a further fall of stocks and spread of upgrading as users are willing to put on their rose-colored glasses to get material—as in other markets. All markets were slow this week with some managing to hold a better-weather improvement.

In Detroit earmarking of industrial scrap is going deeper into the grassroots and large plants no longer issue their usual scrap lists. Florida scrap is easing the Birmingham market.

Two U. S. Steel Co. openhearths at Geneva, Utah, went out for lack of scrap. They are now operating again. Loss was about 5000 tons.

PITTSBURGH—Mill scrap inventories continue to fall. Some producers are down to a 15-day supply. Others are better off but still worried because receipts are not enough to balance consumption. The allocation program is being referred to as "the great leveler." The mill with dangerously low inventory is given preference over the mill which is somewhat better off. As a result, inventories are tending to become relatively equal. As supplies decline, producers become less strict on inspection, and upgrading is growing.

CHICAGO — Increasing allocations of dealer and industrial scrap continue to move scrap out of the area into eastern districts such as Youngstown, Cleveland and Campbell, Ohio. Dealers are attempting to resist further allocations out of the district because of the freight involved in case of rejections and having to ship to strange mills. They also object to preparing heavy melting steel for allocations when they can prepare foundry grades from the material and obtain the higher price. All local mills will pay springboard prices if the deal is right. Some have brought scrap in from as far away as Texas. One major consumer expects a crisis within 30 days if out-of-district allocations are not curtailed.

PHILADELPHIA—Trade feeling concerning the future is mixed in this district. Some say steelmaking operations must drop in the face of the scrap shortage and others say the situation is already improving. The latter point out, however, that mills are still dipping into inventories but not as heavily. Yard intake of scrap seems to have improved in the past couple of weeks.

NEW YORK—Scrap movement here was at last week's level—moving fairly well for this time of year but not sufficiently to meet wicked demand. Reports of upgrading continue to circulate but in view of the situation cannot be regarded as even remotely underhanded. Some foundries reportedly let the bars down on not-up-to-snuff shipments and are in better shape. Others are facing slowdowns.

DETROIT—The market is quiet here. Earmarking of scrap is being extended still further until most Detroit manufacturing establishments, including small plants, have now been taken under the scrap umbrella. The usual scrap lists formerly issued by large manufacturing plants are no longer employed. Some government allocations have been needed to help out electric furnace producers. Scrap inventories are being reduced but not yet, according to the trade, to dangerous limits. The Detroit price situation has been resolved by pricing all scrap sold Mar. 27 or earlier at $39.05. Later sales are priced officially at $40.20 for No. 1 heavy melting.

CLEVELAND—Shipments continue to improve slightly here and in the Valley, but the total is not enough to satisfy anybody. Shipments to one mill have increased but quality leaves much to be desired. Brokers are having a hard time getting cast, and some are trying to bring it in from the West Coast. In general, the overall scrap picture is about the same. Inventories are small and the chance to build up a comfortable margin appears to be gone for the duration.

ST. LOUIS—Weather continues the all-important factor in movement of scrap iron to this industrial district. The improvement was marked during the early part of the week, but later shipments were cut off with bad weather. Allocations are reaching dealers in greater numbers. Railroad supplies are being allocated even in prepared state, thus by-passing dealers which has caused some hard feeling. Consumers' inventories are said to be dangerously low, as melt exceeds receipts.

BIRMINGHAM — Allocation of scrap from Florida to brokers and dealers in this area has relieved the situation considerably, but the supply of No. 1 and No. 2 heavy melting is not enough. The largest user in the district, who previously refused anything but 80,000-ton carloads, is now willing to take 50,000-ton carloads. Other grades of steel and cast and specialties are in fair supply.

CINCINNATI—Demand is terrific and supply is short in an unchanged market here. All available tonnage is moving. Nobody is holding a scrap inventory and yards generally are doing all they can. Cast grades are very scarce and foundries are hard put to maintain operations. One district mill is operating on a car to furnace basis and the shortage of the better grades at the present rate of operations is beginning to look like a permanent feature of the scrap market.

BOSTON—Scrap collections in the Boston area remained normal during the past week. Demand for all grades continues unchanged. Foundries in the area face a shortage of cast.

BUFFALO—Scrap supply continued its improvement here. Two top mills were able to maintain output without dipping into stockpiles for more than a week. More industrial and railroad scrap is coming in. The pickup is confined to steelmaking grades. Cast scrap is still scarce.

unstripped motor blocks

use:

Motor blocks are used as a grade of cast iron scrap in foundries and Open Hearth furnaces. Foreign material such as non-ferrous metals present in spark plugs, bearings, gaskets and steel attachments are stripped. Very often, motor blocks are bought by foundries casting new engine blocks and are thus reincarnated.

source:

Automobiles, trucks, tractors, etc.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Unstripped motor blocks from which steel and non-ferrous fittings have not been removed. Must be free from drive shafts, differentials and parts of frame.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

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BUFFALO, N. Y. Genesee Building	DETROIT, MICHIGAN 2011 Book Building	NEW YORK, N. Y. 100 Park Avenue	READING, PENNA. Luria Building

ST. LOUIS, MISSOURI
2110 Railway Exchange Bldg.

SAN FRANCISCO, CALIFORNIA
Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →	$0.99	.75	.53	.65	.75	.51	.75	.51	.51	.75	.70	.76	.63	.65	.28	1.34	.79	.50	.20	.51	.51	.20	.62	.47	.51	.51	.51	.95	.50	.78	.50	.43	.51	.33	.57	.68	.65	.52	.58	.58
Basing Points →	Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES — **OPS No.**																																								
No. 1 heavy melting — 1	$44.00							$44.00					$43.00				$42.50						$42.00					$41.00	$41.15	$40.00	$39.50	$39.00			$38.00	$37.00					$35.00
No. 2 heavy melting — 2	42.00							42.00					41.00				40.50						40.00					39.00	39.15	38.00	37.50	37.00			36.00	35.00					33.00
No. 1 busheling — 3	44.00							44.00					43.00				42.50						42.00					41.00	41.15	40.00	39.50	39.00			38.00	37.00					35.00
No. 1 bundles — 4	44.00							44.00					43.00				42.50						42.00					41.00	41.15	40.00	39.50	39.00			38.00	37.00					35.00
No. 2 bundles — 5	41.00							41.00					40.00				39.50						39.00					38.00	38.15	37.00	36.50	36.00			35.00	34.00					32.00
Machine shop turnings — 6	34.00							34.00					33.00				32.50						32.00					31.00	31.15	30.00	29.50	29.00			28.00	27.00					25.00
Mixed borings and turnings — 7	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00			32.00	31.00					29.00
Shovelling turnings — 8	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00			32.00	31.00					29.00
Cast iron borings — 10	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00			32.00	31.00					29.00
No. 1 chemical borings — 26	41.00							41.00					40.00				39.50						39.00					38.00	38.15	37.00	36.50	36.00			35.00	34.00					32.00
Forge crops — 11	51.50							51.50					50.50				50.00						49.50					48.50	48.65	47.50	47.00	46.50			45.50	44.50					42.50
Bar crops and plate — 12	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00			43.00	42.00					40.00
Punchings and plate — 14	46.50							46.50					45.50				45.00						44.50					43.50	43.65	42.50	42.00	41.50			40.50	39.50					37.50
Electric furnace bundles — 15	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00			40.00	39.00					37.00
Cut struct., plate, 3 ft and less — 16	47.00							47.00					46.00				45.50						45.00					44.00	44.15	43.00	42.50	42.00			41.00	40.00					38.00
Cut struct., plate, 2 ft and less — 17	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00			43.00	42.00					40.00
Cut struct., plate, 1 ft and less — 18	50.00							50.00					49.00				48.50						48.00					47.00	47.15	46.00	45.50	45.00			44.00	43.00					41.00
Foundry steel, 2 ft and less — 20	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00			40.00	39.00					37.00
Foundry steel, 1 ft and less — 21	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00			42.00	41.00					39.00
Heavy trimmings — 24	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00			37.00	36.00					34.00
No. 1 RR heavy melting — RR 1	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00			40.00	39.00					37.00
Scrap rails, random lengths — RR 14	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00			42.00	41.00					39.00
Scrap rails, 3 ft and less — RR 16	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00					42.00
Scrap rails, 2 ft and less — RR 17	52.00							52.00					51.00				50.50						50.00					49.00	49.15	48.00	47.50	47.00			46.00	45.00					43.00
Scrap rails, 18 in. and less — RR 18	54.00							54.00					53.00				52.50						52.00					51.00	51.15	50.00	49.50	49.00			48.00	47.00					45.00
Rerolling rails — RR 15	53.00							53.00					52.00				51.50						51.00					50.00	50.15	49.00	48.50	48.00			47.00	46.00					44.00
Uncut tires — RR 20	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00			42.00	41.00					39.00
Cut tires — RR 21	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00					42.00
Cut bolsters and side frames — RR 23	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00			43.00	42.00					40.00
RR specialties — RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00					42.00
Solid steel axles — RR 25	58.00							58.00					57.00				56.50						56.00					55.00	55.15	54.00	53.50	53.00			52.00	51.00					49.00
No. 3 steel wheels — RR 27	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00			45.00	44.00					42.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast.	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast.	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y. cast	11	52.00

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; Granite City, East St. Louis, Madison. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary. Los Angeles; Firestone.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Ceiling price is $8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel; $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum**; $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese**; $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon:** electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium**; $1 may be added if scrap conforms to SAE 52100 analysis and is to be used in an electric furnace. In no case is price to exceed No. 1 heavy by more than $1. **Multiple Alloys**; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18, foundry grades, Nos. 20 and 21 and cast grades, 1, 7, 9 and 11.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate; punchings and plate; structural and plate, 1 ft & less, and 3 ft and less; foundry steel, 1 ft & less and 2 ft & less; wrought iron	10.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed, steel scrap	26.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bushelings, prepared new factory	28.00
Bushelings, unprepared new factory	23.00
Short steel turnings	23.00
Mixed borings, turnings	23.00
Cast scrap	48.00 to 50.00

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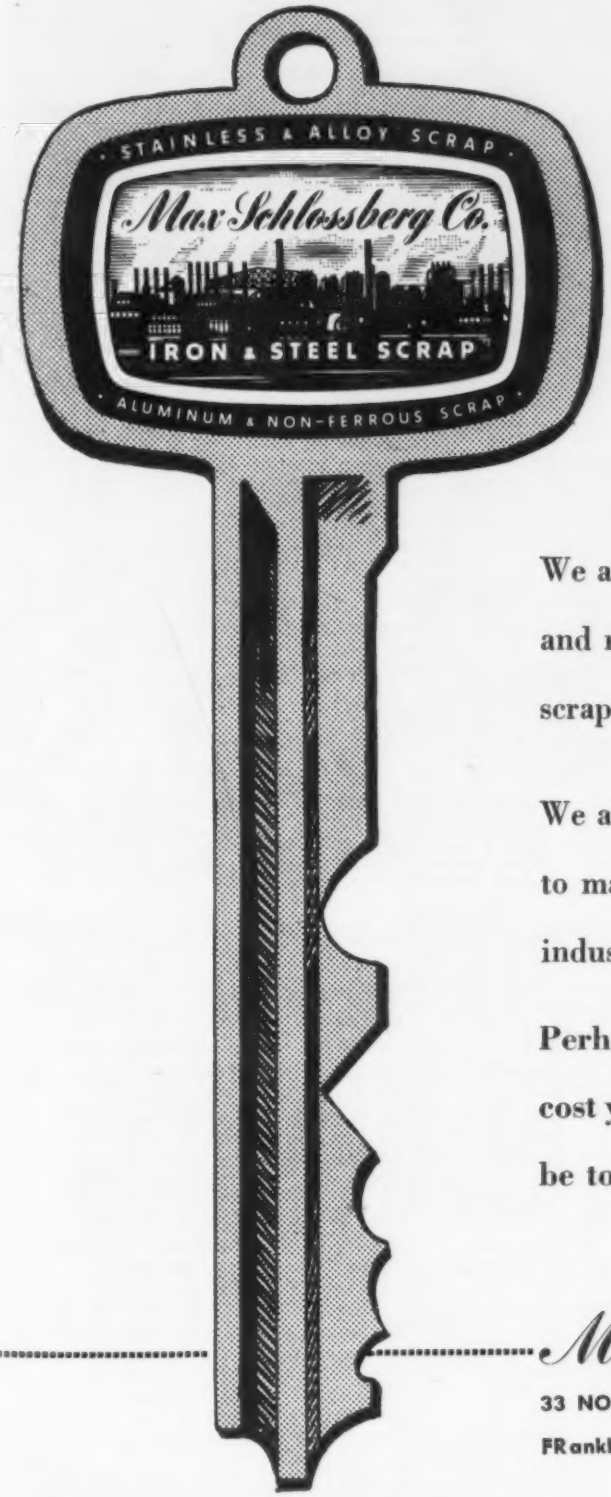

We are brokers and dealers in ferrous and non-ferrous metals—both in scrap and semi-finished form.

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Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Apr. 17, 1951	Apr. 10, 1951	Mar. 20, 1951	Apr. 18, 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	*4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Apr. 17, 1951	Apr. 10, 1951	Mar. 20, 1951	Apr. 18, 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.00*	$44.00*	$44.00*	$32.75
No. 1 steel, Phila. area	42.50*	42.50*	42.50*	25.50
No. 1 steel, Chicago	42.50*	42.50*	42.50*	28.50
No. 1 bundles, Detroit	40.00*	40.00*	40.00*	29.25
Low phos. Young'n	46.50*	46.50*	46.50*	34.75
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	39.50
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	37.50
No. 1 cast, Chicago	49.00†	49.00†	49.00†	41.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.25	$14.25
Foundry coke, prompt	17.75	17.75	17.25	16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin, Straits, New York	*$1.47*†	$1.505	$1.34	76.75
Zinc, East St. Louis	17.50	17.50	17.50	10.50
Lead, St. Louis	16.80	16.80	16.80	10.30
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	53.55	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Apr. 17, 1951	4.131¢ per lb.	$52.69 per gross ton	$43.00 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One year ago	3.837¢ per lb.	46.38 per gross ton	28.92 per gross ton

	Finished Steel Base Price — High	Finished Steel Base Price — Low	Pig Iron — High	Pig Iron — Low	Scrap Steel — High	Scrap Steel — Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.69 Jan. 2	$52.69 Jan. 2	$47.75 Jan. 30	$43.00 Feb. 7
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Rubber Parts...

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This 16-page, illustrated, multi-colored catalog now is available to design, production, purchasing and management personnel. This publication has been compiled to familiarize readers with Stalwart-developed rubber compounds which feature resistance to (1) abrasion, (2) chemicals, (3) high and low temperatures, (4) petroleum products and derivatives, and (5) weathering. Sections of the catalog are devoted to the new and outstanding Silicone Rubber compounds, the major methods of fabrication, and Stalwart production facilities.

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[21]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[21]
Alloy, net ton	$70.00[1,17,6]	$70.00[1,4]	$70.00[1,6]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[21]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[15]	4.10[2,4,33]	4.10[6]	4.10[2]			4.10[6]		4.10[35]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[5,33]	3.60[1,6,9]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]	4.30[22]	3.80[12] 4.40[47]
Cold-rolled	4.35[1,5,9,15,17]		4.35[1,6,9]	4.35[4,5]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]	5.05[22]	4.55[12]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,9]		4.80[4]	4.80[7]	5.50[44] 6.00[54]					4.80[3]	5.50[22]	
Enameling (12 gage)	4.65[1]		4.65[1,9]	4.65[4]		4.65[7]	4.65[6]						5.35[22]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[54]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,6,9] 5.90[6]	5.40[4,5]			5.40[1,4,13] 5.90[6]		5.40[3]	5.65[26]		5.40[3]		5.95[12]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,6,9] 7.05[6]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[12]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9], 4.00[41,58], 3.75[28] 3.50[5,7]	3.50[56]	3.50[1,6,9]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[47] 3.80[12]
Cold-rolled	4.[65,7,9] 5.00[28] 5.35[40,63,58]	4.90[5,56]	4.90[6]	4.65[2,5]		4.65[7]	4.65[4,6] 5.25[48,49] 5.35[13,40]		4.65[3]			4.65[3]		4.85[12] 5.45[47] 5.60[58,61]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[6], 5.60[9]				4.95[4], 5.50[1] 5.40[13], 5.80[6]		4.95[3]	5.55[26]		4.95[3]		5.95[12]
Hi str. low alloy, c.r.	7.20[9]			6.55[2] 6.70[5]			6.20[4], 6.55[13] 7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,9]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[22] 0.50 lb, add 25¢; 0.75 lb add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[15]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,6,9]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70			3.85[21]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,6,9]	3.70[4]			3.70[1,4,6]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,23,70]	4.55[4,74,73]	4.55[2]	4.55[4,62]		4.55[6,57]		4.60[70]					4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,23]	4.30[1,6,9]		4.30[4]		4.30[1,6]	4.30[6]	4.30[3,4]		4.30[3]			4.45[21] 4.65[12]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,23,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,32]		5.40[6,25,57]	5.40[3]	5.40[3]					5.55[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,6,9] 6.05[6]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,23]	3.70[1,6,9]	3.70[4,5]			3.70[1,4,6] 3.95[12]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[22]	
Floor plates	4.75[1]	4.75[1]	4.75[6]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,6,9] 6.15[6]	5.65[4,5]			5.65[4] 5.70[13] 6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,23]	3.65[1,9]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,9] 6.00[6]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[15]	4.85[2] 4.33,34		4.85[2]			4.85[6]	Kokomo—4.95[30] 4.85[35]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[9]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$62.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$68.00[11]	F=$85.00[19] SF, LS, S=$85.00[62]	Geneva=$68.00[18]	Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[62]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[2], F=4.90[19] LA=4.90[24,62]	Worcester=4.40[2] Minnequa=4.35[14] Portsmouth=4.30[20]	WIRE RODS
		3.80[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[84], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[30]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4,11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[62]	Atlanta=4.05[65] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[3], 5.85[68] Trenton=6.00[48]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[62] S=6.30[62]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[24]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon steel
4.30[83]	4.10[83]	3.70[4,11]	SF, S=4.45[62] F=4.40[19], LA=4.40[62]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing
			LA=6.00[4]	Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4]	Cold-finished
4.30[83]	4.70[83]		LA=5.35[62] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19] SF, S=6.30[62] LA=6.25[62]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[62]	Claymont=4.15[29] Coatesville=4.15[21] Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=5.25[35]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19] S=6.55[62]	Geneva=5.65[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.60[4] 3.65[11]	SF=4.20[62] F=4.25[16] LA=4.25[24,62] S=4.30[62]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5.50[11]	SF=6.10[62,19] SF=6.00[62] LA=6.05[62]	Geneva=5.50[16]	Si str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Atlanta=5.10[65] Worcester=5.15[2] Minnequa=5.10[14] Portsmouth=5.25[20]	MANUFACTURERS' WIRE Bright

Key to Steel Producers

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	26.00	28.50	28.50
Billets, forging	26.25	26.25	28.75	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26 50	26.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 45.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			8.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.60	8.60	4.60	
Johnstown-3		4.00			5.60	8.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				9.00
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.00
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.60	9.00
Pittsburgh-77						9.35		9.00
Pittsburgh-78								9.00
Pittsburgh-5				6.15				
Pittsburg-24							4.65	
Seattle-62				6.65			4.65	
Steelton-3	3.60		4.70				4.60	
Struthers-6				6.15				
Torrance-24							4.65	
Youngstown-4				6.15				

BOILER TUBES

$ Per 100 ft., cut, 10 to 24 ft.

F.o.b. Mill	Size		Seamless		Elec. Weld	
	Od-In.	B. W. Ga.	H. R.	C.D.	H. R.	C.D.
Babcock & Wilcox	2	13	22.67	26.68	21.98	25.88
	2½	12	30.48	35.84	29.57	34.78
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48		
	2½	12	29.65	36.32		
	3	12	34.00	41.64		
	3½	11	40.34	49.41		
	4	10	51.21	62.72		
Pittsburgh Steel	2	13		27.09		
	2½	12	30.49	37.15		
	3	12	34.95	42.59		
	3½	11	41.48	50.54		
	4	10	52.65	64.16		

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $43.00
60% or less 40.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. (1) ¢/lb.
Alabama City-4	118	128	....	123	....	136	5.70	6.15
Aliquippa, Pa.-5	118	132	....	....	136	140	5.70	6.15
Atlanta-65	121	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	....	123	143	143	5.70	6.15
Buffalo-85	....	....	....	....	....	....	4.85	....
Cleveland-86	125	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	6.15
Crawfordsville-87	....	132	....	....	....	145	5.95	6.40
Donora, Pa.-2	118	130	....	123	140	140	5.70	6.15
Duluth-2	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130	....	123	....	140	5.70	6.15
Houston-83	126	138	....	....	....	148	6.10	6.55
Johnstown, Pa.-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.2	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind.-30	120	132	....	125	138	142	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	6.65	....
Kansas City-83	130	....	....	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135	....	....	....	145	5.95	6.40
Moline, Ill.-4	....	....	136	....	....	....	....	....
Pittsburg, Cal.-24	137	....	....	147	156	160	6.65	6.80
Portsmouth-20	124	137	....	....	147	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	140	140	5.70	6.15
So. Chicago, Ill.-4	118	128	140	123	....	136	5.70	5.95
S. San Fran.-14	....	....	....	147	....	160	6.65	7.10
Sparrows Pt.-3	120	....	....	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	....	123	140	140	5.70	6.15
Struthers, Ohio-6	....	....	....	....	....	....	5.70	6.15
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa.-51	....	....	150	....	....	....	....	....

Cut Nails, carloads, base, $7.35 per 100 lb. (less 20¢ to jobbers). at Conshohocken, Pa., (26). Wheeling, W. Va. (15)., $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N. Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00

6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less ..... $108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	16.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orlean, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd.	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.58	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[3]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.65[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[3]	8.70–8.75	.....	8.05	8.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[3]	8.55–8.90[3]	6.60	9.45[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.85	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.
EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	51.75	52.25	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Meneeen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-28	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content over 0.70 pct. Silvery iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

(*F.o.b. works*)

Fire Clay Brick — *Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick — *Per Net Ton*

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite — *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.00

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(*51.50% Fe; natural content, delivered lower lake ports*) — *Per gross ton*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.80	7.40	9.35	11.65

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in...	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller.	15	28½	15	28½
9/16. in. & ⅝ in..	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger.	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger.	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger.	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	35	45	28½	39½
9/16 in. & ⅝ in..	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger.	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished 48—10
Packaged, plated finish ..... 31—10
Bulk, plain finish**..... 67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb.*

½ in. & larger..... $7.85

Pct Off List

7/16 in. & smaller..... 50

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright..... 54
⅝ in. thru 1 in. up to & including 6 in. 48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat..... 46
⅝ in. thru 1 in. up to & including 6 in. 41
Milled studs 38
Flat head cap screws, listed sizes.... 16
Fillister head cap, listed sizes..... 24
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. & shorter 53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads 21.60
Ton lots 23.75
Less ton lots..... 25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads 27.75
Ton lots 30.05
Less ton lots..... 31.85

ELECTRODES

Cents per lb., f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.36
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	87¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags... 7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East ..... 10.00¢
Domestic sponge iron, 98+% Fe, carload lots..... 9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 36.0¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe 83.0¢ to $1.48
Aluminum ..... 29.00¢
Brass, 10 ton lots.....30.00¢ to 33.25¢
Copper, electrolytic. 10.75¢ plus metal value
Copper, reduced ...10.00¢ plus metal value
Cadmium, 100-199 lb..95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity..... $3.50
Lead .....7.5¢ to 12.0¢ plus metal value
Manganese ..... 52.00¢
Molybdenum, 99% $2.65
Nickel, unannealed ..... 88.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 38.5¢
Solder powder..6.5¢ to 8.5¢ plus met. value
Stainless steel, 302..... 83.00¢
Stainless steel, 316..... $1.10
Tin .....14.00¢ plus metal value
Tungsten, 99% $4.15
Zinc, 10 ton lots..... 23.0¢ to 30.5¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	....	7.25	8.50	9.30	9.85	....	....
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	....	7.95	9.20	....	....	....	....
Ind. Harbor-3	6.75	7.25	....	....	....	....	....
Mansfield-75	7.25	7.75	9.00	9.80	....	....	....
Niles, O.-64	7.05	7.55	....	....	....	....	....
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si.			22.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C.	$1.09
0.50% max. C.	1.05
.00 min. C.	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.00

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

2

Like to spend more time reading and less hunting? Turn to page 2 of your Iron Age EVERY week and let the contents page help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!

NO WORRY Over Alloy Shortages Here!

Courtesy—Errington Mechanical Laboratory, Inc.

Restrictions in the use of nickel alloys almost brought production of these gears to a halt. Instead, an increasing number of gears are being produced to meet defense requirements—and vital nickel is being conserved. The story contains an idea you, too, may find useful.

The gears, machined from alloy bar stock, form the gear train in a multiple drill head—a versatile, high speed production tool. Precision made to individual specifications, this drill head can drive a number of drills or taps simultaneously, each at its own spindle speed, with only a single work set-up.

The builder—unable to obtain enough nickel moly steel to meet production goals—posed his problem to Frasse Technical Service. Frasse engineers, through wide experience in solving similar problems during World War II, recommended the use of a lean nickel-chrome-moly type, and a heat treatment to suit. The substitute not only met requirements, but was available from Frasse warehouse stock.

Substituting is not a new idea—but are you using it to full advantage? If steel supply is causing you anxiety, why not let a Frasse engineer check "specs" with you? Perhaps he can find you a suitable substitute that's a bit easier to get. There's no obligation. Just write or call your nearest Frasse office today. *Peter A. FRASSE and Co., Inc., 17 Grand St., New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange St., Buffalo 3, N. Y. (Washington 2000) • 157 Richmond Ave., Syracuse 4, N. Y. (Syracuse 3-4123) • Jersey City • Hartford • Rochester • Baltimore.*

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FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$189

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	19.00	75% Si	14.30
50% Si	12.40	85% Si	16.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd, Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

Other Ferroalloys

Alsifer, 20%, Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
- Carload ..... 9.90¢
- Ton lots ..... 11.30¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.
- Ton lots $4.90
- Less ton lots 4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa. freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y. freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $3.25

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
- Openhearth ..... $3.00-$3.10
- Crucible 3.10- 3.20
- High speed steel (Primos) ... 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
- Carload, bulk lump ..... 14.50¢
- Ton lots, bulk lump ..... 15.75¢
- Less ton lots, lump ..... 16.25¢

Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
- Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
- Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B $5.25

Bortam, f.o.b. Niagara Falls
- Ton lots, per pound ..... 45¢
- Less ton lots, per pound ..... 50¢

Carbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
- Ton lots, per pound..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots..... $1.20
F.o.b. Wash., Pa.; 100 lb up
- 10 to 14% B..... .75
- 14 to 19% B..... 1.20
- 19% min. B..... 1.50

Grainal, f.o.b Bridgeville, Pa., freight allowed, 100 lb and over.
- No. 1 ..... $1.00
- No. 6 ..... 68¢
- No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
- Ton lots $1.46
- Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
- Less ton lots $1.80

Silcaz, contract basis, delivered.
- Ton lots ..... 45.00¢

U. S. Biggest Vanadium Producer

New York—A string of small mines in southwestern Colorado, Utah, New Mexico, and Arizona provide almost half the world's output of vanadium, a rare and costly steel alloying element. The vanadium ore is also mingled with that of uranium and when the atomic energy program started in 1939, tailings from the concentration of vanadium ore were used for their uranium content.

In 1907, the auto industry made the first major use of vanadium steels. Their use grew with greater applications in other fields. Vanadium is also produced in Peru, Northern Rhodesia, Southwest Africa, Argentina, and Mexico. U. S. steelmakers use about 90 pct of world output—or more than 1 million lb in the form of ferrovanadium, an alloy containing approximately 40 pct vanadium.

Sharon Debt Limit Raised

Sharon, Pa.—Stockholders of Sharon Steel Corp. have authorized an increase in debt limitation from $15 million to $30 million, and an increase in common stock from 1 million shares to 2.5 million shares.

Two new directors elected were: J. M. Kaplan, president of Welsh Grape Juice Co., and M. D. Safanie, New York investment broker.

The company has received an order for $750,000 of alloy steel strip for military helmets. Sharon Steel was one of the principal producers of this alloy during World War II.

Silver-Clad Steel Available

New York—Rolled silver-clad steel strip in widths to 4 in. and thicknesses down to .005 in. is being produced by the Rolled Plate Div. of American Silver Co., Inc. The strip, produced with a high, as-rolled lustre, is available in any required temper, can substitute for brass, nickel-silver, nickel and other restricted metals, and can be electroplated directly.

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Koppers handles the entire job of protecting industrial plants against corrosion. Here are the steps we take to keep industry's No. 1 enemy under control.

SURVEY—Experienced corrosion engineers will survey your plant and determine where protection is needed . . . how much protection is needed.

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Tar Products Division, Dept. 452T
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August Opening for TCI Building

Birmingham — Tennessee Coal, Iron & Railroad Co. is building a new central employment center for its Fairfield steel mill, with occupancy scheduled for August. It will contain the central housing agency for the steel and wire works, sheet mill, tin mill and the coke by-products department.

The new building will also have a completely equipped apprentice training center to replace facilities now at the coke plant main office building. Completion of the $6 million TCI office building is also expected this fall.

PEI Reports Shipments to Rise

Pittsburgh—Shipments of manufactured porcelain enameled steel plumbing fixtures in the fourth quarter of 1950 were valued at approximately $18.2 million, the Porcelain Enamel Institute reports. This is a slight increase over third quarter shipments and a dollar increase of 50 pct over shipments in the fourth quarter of 1949.

Fourth quarter 1950 shipments included 85,553 lavatories, 324,540 kitchen sinks, 134,687 bathtubs, and 21,398 shower stalls.

Moorman Heads Galvanizers

Atlanta — C. L. Moorman, of Equipment Steel Products Co., Blue Island, Ill., was elected president of the American Hot Dip Galvanizers Assn., Inc., at the 16th annual meeting held here recently. Other officers include: D. B. Noland, vice-president; Bonnie Trent, vice-president; Stuart J. Swensson, secretary-treasurer; S. J. Swenson, Jr., assistant secretary.

To Receive Marketing Award

Philadelphia—This year's Parlin Memorial Award will go to David F. Austin, U. S. Steel Co. executive vice-president—commercial, for "his outstanding contribution to marketing," reports Mrs. Casilda V. A. Wyman, president of the Philadelphia chapter, American Marketing Assn. Mr. Austin will receive the award at a May 16 dinner to be held at the Warwick Hotel here.

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Indifferent to the Old—The shortage of good, used late-type machine tools continues and the disinterest of buyers toward the older models still picking up dust in dealers' warehouses is causing a temporary stalemate in the Cleveland used machinery market.

If buyers get desperate enough the deadlock will be broken. What may be causing added reluctance to dip into stocks of older machines may be the idea that the defense effort will slacken. Only last week Charles E. Wilson, production mobilizer, spoke out against complacency and pledged continuation of rearmament.

Moving Upwards — Cleveland prices of good, late-type machines have been on a steady upward trek until almost any post-1942 machine in good condition will bring the original list price and sometimes even over that.

Dealers argue that these rising prices are keeping many good machines off the market because owners are playing it shrewd and waiting for the top dollar. Others in the field counter that high prices are a must to bring out every available machine. But as one dealer gloomily remarked: "When the market stabilizes, machines will be released, but as long as prices continue to rise, plants will hang on to them and wait for the peak."

Give Us Ceilings—Several dealers here believe that a ceiling price schedule, hard and fast and soon, is needed to solve problems of the used machine tool field. They argue that price controls are needed to halt profiteering and cut short speculative waiting.

Washington was given suggestions on pricing by national used machinery organizations and individuals. It has not yet acted.

Coming Soon?—In Washington, J. M. Fox, MDNA executive director, said industry representatives were scheduled to meet with Office of Price Stabilization officials last week and plans for establishing an advisory committee were under committee. The names are ready but Washington action is lacking.

Mr. Fox indicated that a ceiling price schedule for used machines may be included as part of the general price order for new machine tools which is expected in the near future.

Bloated Demand — Dealers in Cleveland have demand under a microscope and they generally agree that the defense program is its inspiration and barometer. A number of local deals have fallen through when subcontracts were not placed.

Some dealers suspect that demand is bloated and over-emphasized by postcards, telephone calls, and other forms of solicitation to get machines. Often by the time dealers with the needed machines get around to answering some of these inquiries, the demand has vanished. Whether it has been fulfilled elsewhere or just withdrawn is a mystery.

Work Schedules Filled—Cleveland rebuilders report more work than they can handle and one rebuilder said he could double his present volume if facilities and personnel were available. Rebuilding demand from defense contractors with defense reserve machines and from private firms unable to get new models is growing steadily.

Subcontracting Stimulus — Although subcontracting has been growing steadily, the biggest part of it is still ahead. When the subcontracts start to filter down to the grassroots of small business, the demand for used machine tools and equipment will take a sharp jump.

Small firms with subcontracts in hand will know what machines they must keep and which they can release. Market traffic will rise.